



FRIDAY, NOV. 10, 1893.

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Contributions.

Improving the Dalles of the Columbia.

CHICAGO, Nov. 1, 1893.

TO THE EDITOR OF THE RAILROAD GAZETTE:

I have read the editorial note in your issue of the 3d on the proposed boat railroad or canal around the Dalles of the Columbia. The general idea of building such a boat railroad is to work against the monopoly of the railroads, and as a boat railroad would belong to the general government, it could never be bought up by one of the existing railroad companies as a private enterprise could. From a political standpoint this would be an answer to your first *but*.

As regards the second *but*, what you say is only a part of the real facts. The Columbia River above the Dalles is unlike any other river that I have ever seen. It runs through a desert of drifting sand and cliffs of black basalt, and little verdure or vegetation is to be seen anywhere near it. Back from the river, however, and at higher elevations the volcanic soil, which has apparently been washed away nearer the river, remains and is very productive. Boats navigating the river, therefore, would come to places where there is no business, but the railroads with their various branches can take it where it originates and carry it through more cheaply than it can be transferred to boats. Take it all in all it seems to me that any of the proposed plans for securing navigation around the Dalles is simply a waste of money.

M.

The Interlocking Staff System.

The Johnson Railroad Signal Company, New York, Nov. 1, 1893.

TO THE EDITOR OF THE RAILROAD GAZETTE:

I have carefully read the letter addressed to you by "General Manager," and dated Oct. 9. This gentleman seems to be in a quandary as regards the best remedy for our present unsafe method of operating single track railroads, solely by telegraph messages. I wish to draw his attention to the rigid safe-guards obtained by the interlocking staff system. Your correspondent asks "of what good is a block system for trains running toward each other?" Now it appears to me that the Standard Code precisely aims at the maintenance of the block system, under those conditions. The weak point is, therefore, not in the lack of a system for preventing butting collisions, but in our dependence upon the *message* system. In the interlocking staff system the following points are clear, namely:

1. Authority to proceed cannot be easily mistaken, as that authority is represented tangibly in the form of a staff.
2. The issue of more than one staff for the same section of track, at one and the same time, is mechanically prevented.
3. Equal protection is affording to both opposing and following trains.
4. All intermediate switches are thoroughly safe-guarded by the simple addition of a lock at each switch, which mechanically detains the train staff until the switch has been properly secured for the main track.
5. The apparatus has been in practical use for some time; is especially designed for rough railroad use, and is of small cost.

Messrs. Webb & Thompson, the inventors, have been awarded a special medal and diploma for the interlocking staff apparatus, exhibited at the World's Columbian Exhibition.

ARTHUR H. JOHNSON.

Location of Washout Plugs in Locomotive Fire-Boxes.

TO THE EDITOR OF THE RAILROAD GAZETTE:

The average visitor to the Transportation Building at the World's Fair found much to wonder at in the development of the locomotive, as illustrated in the difference between the old machines and models exhibited and the many rows of most recent design. Such a visitor was generally most interested in the two extremes of size and the usual question was: "Where is the largest and the smallest?" The designers of locomotives, and those interested in the performance of the same, examined more closely the details of the machines and no doubt each found something that needed explanation. There were several such cases occurred to me, to only one of which I would call your attention now.

It is in regard to the proper location of the wash-out plug in the water legs of the firebox; I think that the general practice has been to place the wash-out plugs as near the spacing ring as possible, so that the sand and scale could be more easily drawn out by the cleaning hook, and to locate them on the curve of the corner, so that two sides could be reached from the same hole. On one of the locomotives in the American exhibit, the wash-out plug was placed between the first and second rows of staybolts from the bottom, and must have been located there for some purpose which does not appear.

It would seem that the best location, or arrangement of such openings for washing out the water space would be to have two holes at each corner, one vertically through the spacing ring through which the sediment and water could drip, and one through the sheet just above the spacing ring through which to operate the cleaning rod. Of course in cases where the fire-box extends over the frames and rests on them the vertical opening in the ring can not be used. The first row of staybolts is generally placed too near the spacing ring; if as much space as possible consistent with safety is allowed between the staybolts and spacing ring, and a good sized opening provided at each corner as near the ring as possible, the cleaning of the water space could be more efficiently and quickly done. Such an arrangement would be of greater value on a road, or division of a road, that is supplied with such bad water that the boilers need to be washed out after every trip of 200 or 300 miles, but would also save some time on roads where the boilers are washed only once a month.

A. Z.

Brake Rigging and Slack Adjusters.

TO THE EDITOR OF THE RAILROAD GAZETTE:

I have just read your synopsis of Mr. James Howard's paper on these subjects, before the Central Railway Club. Mr. Howard is quite right in his opinion that a great deal of the inefficient action of the brakes is due to bad adjustment of the brake gear. It is by no means the only inefficient element in the brake gear, but it is important.

I have recently been looking into the matter of the percentage of brake power lost on account of the customary mode of hanging brake beams, and find that a very considerable and variable amount of power is lost in bringing up the brake shoes to the wheels, against the resistance of the release springs. This feature also cuts a considerable figure in the adjustment of the brakes, either by hand or by slack adjuster. If the release springs are of unequal tension it is evident that, in taking up the slack, the shoe upon that end of the beam where the lightest release spring is placed may drag against the wheel, while the shoe at the other end is some distance from the wheel. This is also true when, as frequently happens, a new shoe is placed upon one end of the brake beam only, while a partially worn shoe remains upon the other end. In this case, if the brake beam release springs are evenly adjusted, an attempt to take up the slack will result in bringing the new shoe up close to the wheel, while the worn shoe is some distance away. All these matters have an important bearing upon the subject.

Mr. Howard's assertion that "the only place to take up the slack is at the cylinder" appears to me to be a somewhat one-sided view, the result of prejudice in favor of his own slack adjuster. Especially in freight brake systems, it frequently occurs that the live truck lever cannot be moved through a sufficient distance to wear out the shoes. Where the slack is adjusted at the brake cylinder, the cylinder levers are given a constantly changing angularity, and the live levers are drawn up toward the center of the car. While the changing angularity of the levers may not be a really serious objection, it is evident that, as the live levers are pulled up toward the bolster on freight trucks to take up the slack, their motion for application of the brakes is constantly more restricted; and, if they pull up against the stop before completely applying the brakes, it is evident that the piston might as well be against the cylinder head. In such cases an adjustment of the dead lever by hand would be necessary, even with the use of such an automatic adjuster. I am told that it has always appeared to the Westinghouse Air-Brake Co. that the proper place to take up the slack is at the top of the dead lever, so that the moving mechanism between the brake cylinder and the brake beams shall always operate the same.

INSPECTOR.

Mnemonics and Red Coats.

DESERONTO, Ont., Nov. 10, 1893.

TO THE EDITOR OF THE RAILROAD GAZETTE:

A great many instances have occurred of trainmen not carrying out orders received by them relating to the passing of trains. In some cases they absolutely forget all about the order. It is well, therefore, to multiply safe-guards, at least to a reasonable extent, so that the trainmen, besides charging their minds with the orders received, shall have, and continue to have, ocular notice of the existence of train orders until the said orders have been carried out; and I venture to suggest that all the members of the crew of each train should have red coats. The men should have small leather bags as part of their outfit, these bags to be kept about their persons by a shoulder-strap, and on receipt of the train order a coat of light material, but red in color, is to be taken from the bag and put on over the ordinary coat.

If this plan should be carried out, it would be well-nigh impossible for a train order to be overlooked; then the sight of every trainman is a notice to the other trainmen of the existence of train orders, and that the train mentioned in said order has not yet been passed. This might be varied to red colored gloves, a neck yoke similar to Masonic or Oddfellow emblems or a red cap. This suggestion will be received by many as ridiculous, but if it will tend to prevent accidents it is surely worth a trial. The mute protests of dead bodies and the active protests of the injured should remove the ridiculous phase from the mind of any trainman.

R. C. CARTER.

[The English clearing-house code has for many years provided that the pilot guard, who conducts trains over single track (chiefly in emergencies when double track has to be used as single) shall wear a red cap and a red cross belt; and that provision is still in the code. How much the rule is practiced we do not know. Our correspondent will find an obstacle to his plan in this country, however, in the fact that the red coats would come to be understood by passengers and would therefore give them needless anxiety. It is impossible to so arrange that the passengers can furnish the necessary supply of anxiety when a collision really is impending, and as for ordinary times they do enough useless speculating about possible dangers already. A Boston paper made up a very interesting little story the other day about "A Scare at the Chester bridge," based on the fact that a brake hose burst a few miles east of Chester.—EDITOR RAILROAD GAZETTE.]

Track Elevation in Chicago.

Three months ago the Mayor of Chicago engaged a consulting engineer who was to examine all the railroad tracks in the city and suggest some practical plan for elevating them. The engineer was also to examine the plans submitted last August by the Pittsburgh, Fort Wayne & Chicago, for the elevation of its tracks and to consult with the Mayor concerning their acceptance by the city and concerning the preparation of similar plans for the elevation of the tracks of the Western Indiana Railroad; the tracks of the two roads being near together and running parallel for several miles. It was thought that the elevation of each should be as much like the other as possible.

The report of the consulting engineer was presented to the Council week before last in the form of two general ordinances that provide in a very general way for the elevation of the tracks of both companies from a point 1,150 ft. north of Archer avenue, reaching an elevation of 6 ft. at that avenue and of 10 ft. at Bushnell street, continuing at the latter elevation to Thirty-first street. At Thirty-first street a descent begins and is to be sufficient to clear the viaduct at Thirty-seventh street, the tracks continuing at the lower elevation to Forty-seventh street, where they are to descend to grade at the switching yards. The rise begins again at Fifty-first street, reaching an elevation of 10 ft. at Fifty-fifth street, and continuing to about Sixty-fifth street, from which place the descent begins again, reaching grade at Sixty-eighth street. Clear head room is under the tracks at Twelfth street, and a maximum depression of the streets under the tracks of 7 ft. 6 in. is provided for.

The plans submitted by the Fort Wayne road some time ago, were similar to those followed by the Illinois Central in elevating its tracks near Jackson Park, and similar plans were recommended for the elevation of the Western Indiana tracks. The consulting engineer for the city recommended that such plans be adopted, and the ordinances presented provided only for the general plan to be followed, leaving all the details to the Commissioner of Public Works and the engineers for the railroads.

The Council had evidently expected ordinances giving every detail for the work, and seemed much provoked that such were not presented. The officers of the Western Indiana claimed that the report was valueless because it did not state whether it would cost \$5,000,000 or \$40,000,000 to carry out the plans. The difficulty between the Council and the consulting engineer to the city seems to be that the Council expected too much in the time and from the facilities allowed the engineer. The objection of the Western Indiana that no estimate

of the cost of elevation was given seems trivial, and this is the interpretation put on it by the Corporation Counsel. He states that the ordinances introduced were only skeletons and it was for the railroads to say how they should construct the elevated tracks, as they would be held responsible for any accidents that might occur.

The corporation counsel considers that it is time for the Western Indiana to consider the matter seriously, and with this end in view he has brought suit in the Circuit Court to eject the company from Wallace street and Stewart avenue, which includes nearly the entire main line of the company in the city, and notice for the removal of nearly all the other tracks of the company, including the Belt line, within 10 days. The suit for ejectment is served on the lessees of the tracks as well; these include the Chicago & Eastern Illinois, Wabash, Chicago & Grand Trunk, Chicago & Erie, Louisville, New Albany & Chicago and the Aetison, Topeka & Santa Fe. The damages to the city are placed at \$5,000,000. The Corporation Counsel says that he is in earnest in bringing the suit.

Twelve-Ton Locomotive Crane.

Illustrated herewith is one of seven locomotive cranes which the Industrial Works of Bay City, Mich., furnished the World's Columbian Exposition to handle the heavy

train of bevel, spur and worm gearing, the last of which will lock the crane in any position desired. The friction clutches do not start the crane suddenly or positively, so as to rack or wrench it. The radius varying appliance also consists of a worm, worm wheel and drum. It is operated from the engine shaft, and a part of it may be seen in the engraving. The traveling mechanism consists of a train of spur gearing, operated through the hollow center pin upon a shaft (29), which carries two chain wheels. The wheels, through driving chains, propel the forward and rear trucks of the car body. These motions are actuated by levers of forged iron so arranged as to work backward and forward, and they are conveniently at hand as the operator stands facing the work. All the gearing, except that of the large internal slewing rack, is of cast steel, with large bearing surfaces and means for lubrication. The clutches are all positive except those of the slewing mechanism before mentioned.

The boiler is upright, tubular, 42 in. in diameter by 9 ft. high. It has 200 tubes, each 2 in. in diameter, and connected with the crown sheet by copper ferrules which insure durability and freedom from leakage. The boiler is jacketed, as are the cylinders, and is provided with a Worthington duplex pump to feed it. The fittings are the best of their kinds and include a locomotive pop safety valve, try-cocks, gauge-cocks, water gauge and

was decided upon as being well adapted to furnish steam for one or two engines.

During the first test the Worthington high duty engine was used, and 8.85 lbs. of dry coal were burned per square foot of grate per hour, and 1.63 lbs. of water were evaporated from and at 212 deg. by each square foot of heating surface, both of which are moderate rates. During the second test, however, both Worthington engines were used, and the above quantities were respectively 16.06 lbs. and 3.00 lbs., which are rapid rates. Notwithstanding this the evaporation was higher on the second than on the first test, and also notwithstanding the fact that the boiler was cleaner on the first than on the second test. The evaporative results are among the very highest on record, and have seldom been equaled.

The firing was done by three men in their regular shifts, so that no unusual precautions were taken to obtain good results, except that the boiler was thoroughly cleaned before the first test. Before the second test, however, the boiler tubes were merely blown out by steam in the usual manner. It is probable that the boiler is giving almost if not quite this performance in every day service.

The trials were each made by getting up steam and then drawing the fires. New fires were immediately started, and great pains were taken to secure accuracy in water levels and steam pressures at the beginnings and endings of the trials. The water and coal were weighed on good standardized scales.

The grates are Cone's patent shaking and are made by the I. P. Morris Co., Philadelphia. They are coarse and well adapted for rapid combustion. The boiler has a double furnace with fire brick arches, and a long combustion chamber. There is a feed water heater in the smokebox having as much copper feed pipe as the space permits. This was specially designed by Mr. Dean.

The test of the boiler was made by the designer, and a table of the results is appended.

Dimensions of New Bedford Water Works' Boiler.—Designed by F. W. Dean.

Inside diameter of barrel.....	82 in.
Length of boiler over all.....	31 ft.
Width of outside of fire-box.....	8 ft. 8 1/4 in.
Top of boiler above floor.....	10 ft. 11 in.
Length of each grate.....	6 ft.
Width of each grate.....	3 ft. 9 in.*
Length of each furnace.....	10 ft. 7 1/2 in.
Length of combustion chamber.....	3 ft. 6 in.
Number of tubes.....	160
Length of tubes.....	12 ft. 6 in.
Outside diameter of tubes.....	3 in.
Total heating surface.....	1,998 sq. ft.
Total grate surface.....	45 sq. ft.*
Ratio of grate to heating surface.....	14.4 to 1.*

* Original.

Results of Boiler Trials for the New Bedford Water Works.

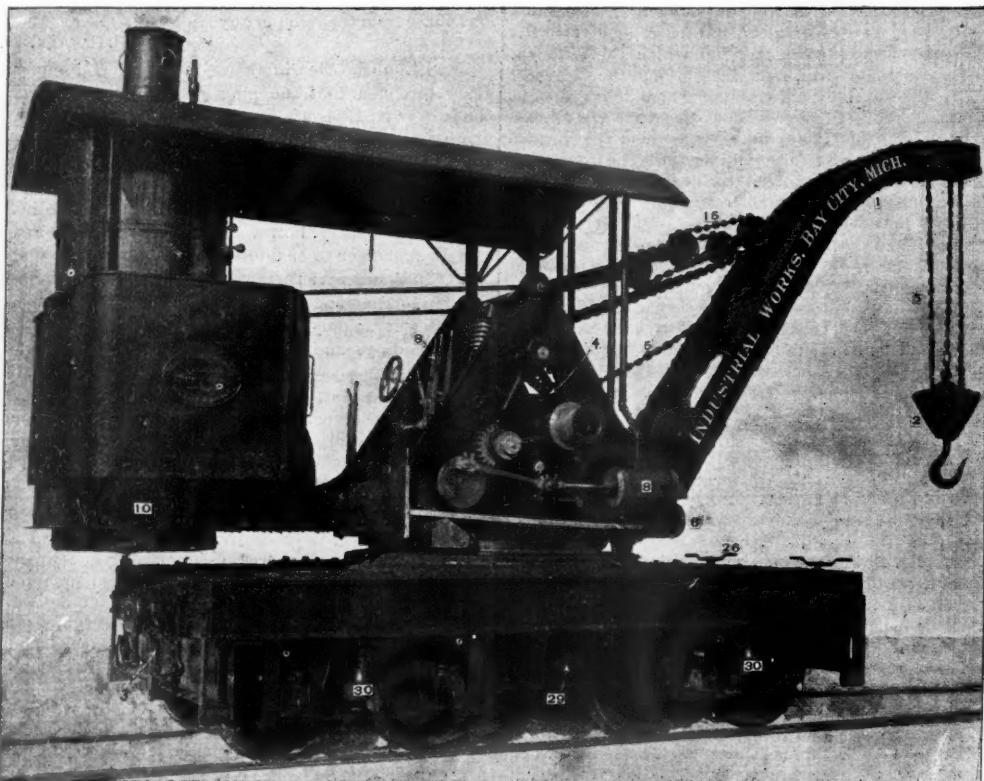
82-in. Belpaire Boiler—Designed by F. W. Dean.

Kind of fuel—George's Creek, Cumberland.

		May.	
		18.	19.
Date of trial—	8-3.		
Duration of trial.....	hours.	12.3	12.26
Dimensions and Properties.....			
Grate surface of each boiler.....	sq. ft.	30.5	30.5
Grate surface, total.....	"	30.5	30.5
Water-heating surface of each boiler.....	"	1,998	1,998
Water-heating surface, total.....	"	1,998	1,998
Ratio of water-heating surface to grate surface.....	"	65.5	65.5
Average pressures.....			
Steam pressure in boiler, by gauge.....	lbs.	14.03	113.35
Absolute steam pressure.....	"	128.47	127.93
Atmospheric pressure, per barometer.....	"	14.42	14.58
Force of draft in inches of water.....	in.	0.35	0.54
Average Temperatures.....			
Of external air.....	deg.	57.9	62.4
Of fire room.....	"	94.5	96.8
Of steam.....	"	246.2	345.9
Of escaping gases, after leaving feed-water heater.....	"	360.3	468.8
Of feed-water, before entering feed-water heater.....	"	135.3	126.56
Of feed-water, before entering boiler.....	"	158.7	154.0
Fuel.....			
Total amount of coal consumed.....	lbs.	3,701	6,334
Moisture in coal.....	per cent.	5.15	5.15
Dry coal consumed.....	lbs.	3,521	6,008
Total refuse, dry.....	lbs.	260	309
Total combustible (dry weight of coal, less refuse).....	lbs.	3,115	5,699
Dry coal consumed per hour.....	"	270	480
Combustible consumed per hour.....	"	253	465
Caloric value of 1 lb. of coal, by experiment.....	B. T. U.	14,922	14,092
Caloric value of 1 lb. of coal, by analysis.....	"	14,977	14,977
Results of Calorimetric Tests.....			
Quality of steam, dry steam being taken as unity.....	"	0.9961	0.9962
Percentage of moisture in steam.....	per cent.	0.39	0.38
Water.....			
Total weight of water pumped into boiler and apparently evaporated.....	lbs.	36,1	66,924
Water actually evaporated, corrected for quality of steam.....	"	36,575	66,663
Equivalent water evaporated into dry steam from and at 212 deg. F.....	"	40,123	73,529
Equivalent water evaporated into dry steam from and at 212 deg. F. per hour.....	"	3,262	5,997
Economic Performance.....			
Water actually evaporated per pound of dry coal, from average pressure and temperature.....	"	11.01	11.09
Equivalent water evaporated per pound of dry coal from and at 212 deg. F., excluding feed-water heater.....	"	12.08	12.23
Equivalent water evaporated per pound of dry coal from and at 212 deg. F., including feed-water heater.....	"	12.35	12.53
Equivalent total heat derived from a pound of dry coal, excluding heater.....	B. T. U.	11,667	11,812
Equivalent total heat derived from a pound of dry coal, including heater.....	"	11,927	12,121
Equivalent water evaporated per pound of combustible from and at 212 deg. F., excluding feed-water heater.....	lbs.	12.89	12.90
Equivalent water evaporated per pound of combustible from and at 212 deg. F., including feed-water heater.....	"	13.17	13.23
Efficiency of boilers, excluding feed-water heater.....	per cent.	77.22	78.87
Efficiency of boilers, including feed-water heater.....	"	79.7	80.93
Rate of Combustion.....			
Dry coal actually burned per square foot of grate surface per hour.....	lbs.	8.8	16.16
Rate of Evaporation.....			
Water evap rated from and at 212 deg. F. per square foot of heating surface per hour.....	"	1.6	3.00

Coal Analysis.

Moisture.....	0.49 per cent.
Carbon.....	84.55
Hydrogen.....	4.83
Nitrogen.....	1.00
Oxygen.....	3.86
ASH.....	4.61
Sulphur.....	0.61
	100.00



12-Ton Locomotive Crane—Bay City Industrial Works.

exhibits about the fair grounds. The engraving shows clearly the general design of the crane, the machinery, the car body and the devices for jacking it up and clamping it to the rails.

The car body is constructed entirely of steel and iron. It is 20 ft. in length by 9 ft. in width, and mounted upon eight 33-in. wheels. The gauge is 4 ft. 8 1/2 in., and the axles carry M. C. B. standard boxes, wedges, brasses and pedestals. Upon the car body is mounted a heavy cast iron bed plate, the full width of the car, accurately bedded and bolted to it. A roller path is turned upon it, which takes the vertical thrust of the jib. This bed casting also receives and secures a hollow steel center-pin, which pin receives the horizontal thrust due to the load. The car is fitted with link and pin couplings to couple with other cars, and has telescopic needle beams which add much to the stability of the crane in side lifting. It is also provided with track clamps and jacks (30), all of which are shown in the engraving.

The frame of the crane is cast iron, and to it are secured the boxes for the shafts operating the mechanism for hoisting, slewing and traveling. The shafts are of forged iron and steel, and are supported in large bearings of brass.

The crane is operated by two cylinders 8 in. diameter x 10 in. stroke, which are neatly jacketed with asbestos, wood, and planished iron. A locomotive link reversing motion is provided for traveling. There are four motions which may be executed independently or simultaneously. The load may be hoisted, it may be slewed about the axis of the crane, it may be brought nearer to the car body by varying the radius of the jib, and the crane itself may be propelled along the track. The operation of hoisting is accomplished by a train of spur gearing actuating directly the hoisting chain drum. Suitable sustaining and lowering brakes are provided, so that the load may be handled with dispatch. The slewing motion in either direction is made, without reversing the engine, by a double clutch and by a

blow off cocks. The smokestack is about 4 ft. high, making the total height above the track about 14 ft. Water and coal storage is provided. The water tank is of plate steel, holding 400 gallons of water, and ample coal bunkers are built upon one side of the boiler. The greatest height of the jib or boom above the rail is 16 ft. and the least height in working position is 13 ft.

One of the best recommendations that these cranes could have is the record they have made at the World's Fair during the installation of exhibits. Of the seven cranes furnished five were seven tons and two were twelve tons capacity, the illustration being of one of the fair class. They were in almost constant use for the three months preceding the opening of the Exposition. The following extract from a letter by the General Manager of the Transportation Department is interesting: "In the different departments there were handled 119,046,697 lbs. of exhibits in 355,520 packages and 7,281 cars. Of these packages such as were not easily handled otherwise were lifted and transferred by these machines. During this time they uniformly gave the best of satisfaction and never failed to respond when work was required of them. They performed services of great value and are commended for such uses."

Trials of New Bedford, Mass., Water-Works Boiler.

This is a boiler of the Belpaire locomotive type, and was designed by F. W. Dean, Mem. Am. Soc. M. E., of Boston, and built under his inspection, to satisfy future needs of the pumping plant as well as the present. It is intended to carry 160 lbs. of steam in the future, but at present carries only 115 lbs.

In seasons of small water consumption it drives either a high duty Worthington engine, a low duty Worthington, or a simple condensing McAlpine engine, or any two of them combined. The boiler was built with a grate surface of 45 sq. ft., but to suit present needs it was reduced to 30 1/2 sq. ft. by means of fire brick. This

A 20-Ton Steam Wrecking Crane.

The illustration shows a steam wrecking crane built by the Bucyrus Steam Shovel & Dredge Company, of South Milwaukee, Wis. It is designed to lift 40,000 lbs., at a radius of 24 ft. from center, within a horizontal arc

eye-bars with holes for holding the jib in two positions. The jib can be lowered for transportation by carrying the hoisting rope around a suspended sheave at the top of A frame. This sheave is always in position and ready for use. The operation of changing the jib from a high to a low position is accomplished easily and quickly.

To add to the stability of the car when lifting side loads, and also for taking the extra weight off the forward truck, two steel jack-arms are provided and hinged to the base of the A frame in such a manner that they can be folded up against it when not in use. Small tackle is provided and attached to the A frame for raising and lowering them. The jack-arms are pin connected to top and bottom members of the transverse truss over the forward truck, so that they form a continuation of the truss.

The engine consists of two cylinders each 8 in. in diameter by 12" stroke, mounted on heavy double frames with shafts and drums. These engines fulfill four offices.

(1) That of main hoisting. For this purpose a groove drum 36 in. in diameter, shown in cut, and of sufficient length to wind 150 ft. of 2-in. manilla rope in one coil, is provided, and furnished with clutch and friction brake for holding and lowering. The grooves fit the rope, and save much wear compared with either the smooth drum or the warping spool ordinarily used. The drum is made large to prevent the winding back upon itself, as frequently happens with smaller drums. No extra man is required to handle the rope, as is required with the warping spool.

(2) That of light hoisting. For this purpose a secondary tackle of 4-in. manilla rope is provided and carried to a warping spool on the end of the main shaft. It is sometimes attached to the jib near lower end, and worked by hand cranks from the platform and used in connection

car. The hoisting rope is carried out to the jib by two sheaves, one located under center bearing of jib, and the other upon the inner end of jib. These sheaves are 19 in in diameter, of iron, with turned grooves to fit the rope. Three similar sheaves are mounted in the end of the jib and constitute the upper block.

The vertical boiler is of the submerged flue type, 48 in. diameter by 7 ft. 6 in. high. The water tank is of wrought iron and of 500 gallons capacity.

Railroad Extension in India.

Toward the close of 1892 orders were issued for the survey of a broad gauge line from Delhi, to join the Bhatinda-Bahawalpur Railroad, and a detailed survey of two alternative routes was decided upon, the portion from Delhi to Rohtak (42 miles) being common to both routes. Leaving Rohtak the northern route passes near Hind Johanna Ratha, and joins the Bhatinda-Bahawalpur Railway near Malaut, which is 26 miles west of Bhatinda. This route passes through a well irrigated country, and offers prospect of a large grain traffic. It also opens a tract of country which is not at present adequately served by any line of railroad. It is proposed to connect this route with Bhatinda and the Rajpura-Bhatinda Railway by a branch about 18 miles long. There are no engineering difficulties, and the Ghaggar is the only large river which has to be crossed. The distance from Delhi to Samasata by this route is about 395 miles; this reduces the distance from Delhi to Kurachee to 937 miles, a saving of 232 miles over the present standard gauge route.

The southern route proceeds from Rohtak to Hansi, and thence along the Rewari-Ferozepore section of the Rajputana Malwa Railway, on which it would be necessary to have a mixed gauge up to the crossing of the Ghaggar River, about three miles beyond Sirsa. From that point it takes a direct route to Abohar, and joins the Bhatinda Bahawalpur Railway at the 48th mile from Bhatinda. The branch from Bhatinda joins near Sitoo Ganoo, and will be 36 miles long. The country traversed by this route is of a poorer character than that on the northern route, and on parts there will be drift sand to contend with; on the other hand, there will be a shorter length of new line to construct. The distance by this route from Delhi to Samasata will be about 390 miles. Kurachee will in either case have a through route from the wheatfields of the Panjaub, which will be 235 miles shorter than the existing route. As a London syndicate have offered to find the capital, and start the work at once, it is probable that it will be commenced early in 1894.

The survey of a broad gauge line from Wazirabad to Mooltan, a distance of 200 miles, is making fair progress; it will pass through the track of country which will be irrigated by the new Chenab canal.

Three routes for a railroad into Kashmir have been surveyed. The Jhelum Valley route would take off from the North Western Railway at Manikiala station, 16 miles east of Rawalpindi, and join the valley of the Jhelum at Baroe, on the high-road to Poonch, at the 35th mile.

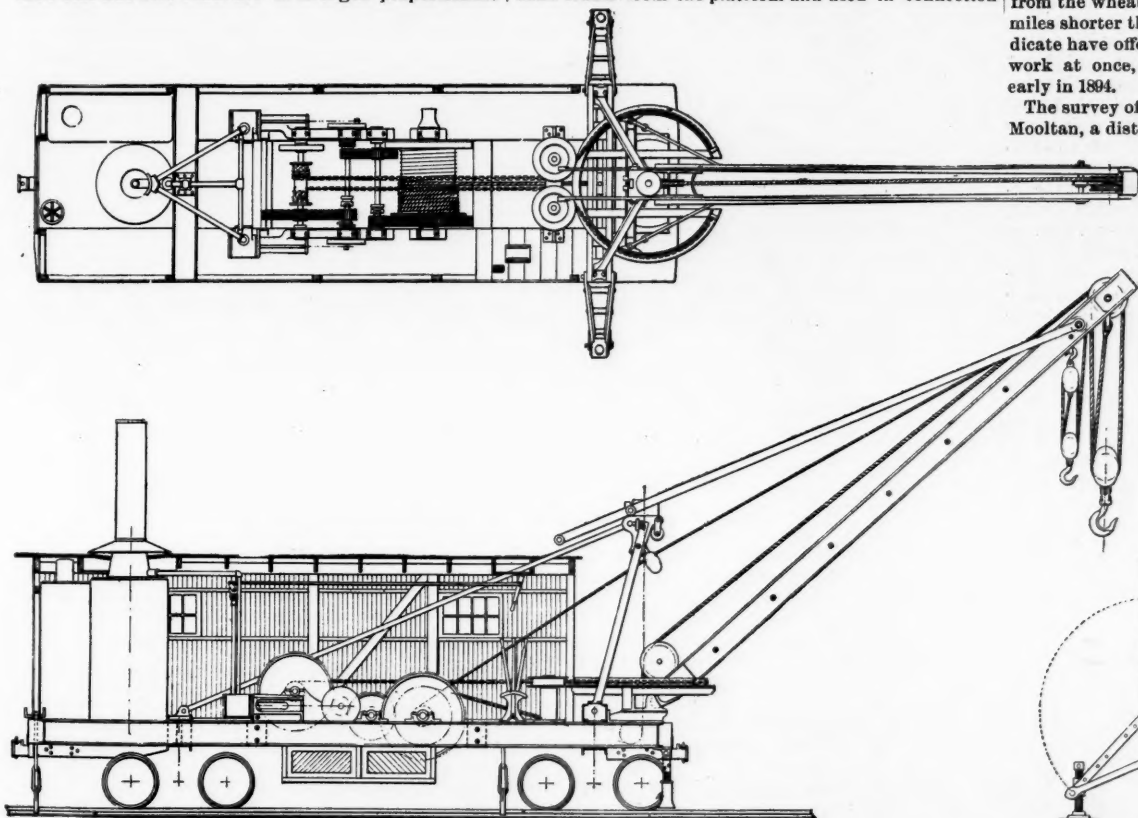


Dean Boiler—New Bedford Water Works.

of 30 deg. either side of the track, and to lift lesser weights through an arc of 200 deg. within the limit of the stability of the car.

The car frame has four longitudinal sills of 15 in. I-beams running its entire length. These are strongly bound together by cross sills of iron plates and channels and white oak end pieces. The longitudinal beams are further connected at intervals by cast-iron distance pieces and 1½ in. bolts extending the whole width of the car. The floor of the car is of wrought iron plates riveted to the beams.

The crane end of the car is supported on one center-bearing truck of extra heavy pattern, 90,000 lbs. capacity. The axles are of steel, 6 in. in diameter, with journals 5½ in. x 8 in., wheels 33 in., M. C. B. standard. The arch bars and axle boxes are of strength proportionate



20-TON STEAM WRECKING CRANE—BUCYRUS STEAM SHOVEL & DREDGE CO.

to the axle. The rear end of car is supported on one truck of 60,000 lbs. capacity, M. C. B. standard.

An "A" frame is erected so as to center over the swinging platform. It is of heavy steel bars 4½ in. square, solid, with chamfered corners. The feet of these "A" pieces are solid forged with bored eyes, and they hinge to base castings on the car body by 3 in. pins. These base castings are very heavy, and are carried in double 10 in. channels riveted to car body. These base castings also take the jack-arms so that the thrust or bearing of the A frame is communicated directly to the jack-arms. The A frame legs are united at the top by a gudgeon casting of massive pattern, and are secured by turn bolts. The clear height of top of the A frame from rail is 14 ft. 6 in.

The jib or boom is of steel channels 31 ft. long from center to center, and when in position the center of sheaves is 26 ft. high, and gives a sweep of 24 ft. radius. The jib is suspended from the top of the A frame by two

with the secondary tackle. When so attached it has a lifting capacity of about 10 tons.

(3) That of swinging of jib. This is accomplished by a swinging circle and two chains, shown in cut, that connect it to the swinging drum of the engine. It is arranged with a powerful brake, so that it can be securely held in position while at work.

(4) That of raising and lowering the jib. This is done by connecting the hoisting rope to the sheave at head of A frame as before described.

The main shaft and crank shaft are of hammered steel, the former being 4½ in. diameter. The pinion on crank shaft is of cast steel, link motion of locomotive pattern. All important parts are compensated for wear, and provisions are made throughout for continuous lubrication. A winch head for general warping purposes is placed on projecting end of hoisting shaft, shown in plan. All of the motions are under control of one man, and the operating levers conveniently arranged near forward end of

Near Kohala the Jhelum is crossed by one span of 300 feet, and the line continues thence up the left bank of the river as far as Domel. From this point—mile 86½—the two alternative lines up the right and left bank of the river diverge.

The Abbotabad route takes off from Sarai Kala station on the N. W. Railway (19½ miles west of Rawalpindi) and runs through British territory for 90 miles, passing Abbotabad, 3,964 feet above seal level at the 55th mile, and is in much safer and sounder ground than the Jhelum Valley route, which it joins near Domel. These lines vary in length from 184 to 200 miles, and at the present value of the rupee would cost, it is supposed, about \$9,000,000.

After careful examination of three routes suggested for the ascent of the Shan Plateau, in Burmah, the route by Maymo has been selected as being much the least difficult. The distance from Mandalay to Thebaw on the probable line of the railroad is about 124 miles. The most

of this is rather light work with ruling gradients of one in forty, but there will be eight miles of rack railroad on an 8 per cent. grade, and one tunnel 1,500 ft. long. A bridge of some importance will also have to be built, the longest span not exceeding 250 ft. and the highest pier probably about 80 ft. The various surveys have indicated the necessity of short sections with grades of one in 12½, say 420 ft. to the mile, involving racks. A route is, however, now under investigation which it is hoped will eliminate the rack sections entirely. It is estimated that by using wooden bridges, and enforcing economy wherever possible, this line could be constructed for \$30,000 per mile throughout, but it is doubtful whether wooden bridges will be allowed, even as a temporary measure, although Burmah teak timber is specially adapted for such work.

The Kalka-Simla, 2.6 gauge, is still under consideration, but the summer capital of India is not likely to obtain direct railroad communication with the plains for some time to come. The 1884-85 survey resulted in a scheme for an adhesion line 68 miles in length, with very sharp curves. There are three distinct ranges of hills between Kalka and Simla, and although the distance as the crow flies is only 23½ miles, the shortest line obtainable must, with a special system of traction, be at least 48 miles, while an ordinary adhesion line would certainly not be less than 68 miles.

The Nilgiri Mountain Railroad is being pushed on; most of the girders, permanent way, material, etc., has been received and most of the bridging has been completed. The Abt rack and fastenings, as well as the rolling stock, were ordered some months ago, and more than three-fourths of the earthwork has been completed.

It is proposed to reduce the width of the Godavari River (East Coast Railway), from 8,000 to 5,000 ft., by training works, near Rajahmundry, and to bridge it with 19 spans of 250 ft. on 80-ft. walls; but as this project has been shelved for want of funds, a steam ferry capable of transporting loaded cars has been established.

It is also proposed to improve the grades and double the track of the North Western, between Kurrachee and Kotri, but so far only the necessary survey has been sanctioned.

The construction of the Madras-Bevada Railway has been postponed for financial reasons. The Cuttack-Midnapur-Calcutta Railway survey, which includes a tunnel under the river Hooghly at Budge-Budge, and a steam ferry at Diamond Harbor, is being carried out by three parties, and is well advanced. The borings for the tunnel indicate stiff blue clay to a depth of 40 to 47 ft., followed by yellow clay to 57 ft., after which sandy water bearing strata are met with. This line will be 5 ft. 6 in. gauge, and the total length is 300 miles.

The Zapti Valley Railroad, which is to connect the B. B. & C. I. with the G. I. P., takes off from a point 2½ miles south of Surat station, and joins the G. I. P. at Jalgaon, with a branch to Dhulia and Inanmad; total length, 265 miles. The survey has been nearly completed, and the two railroads concerned are prepared to find the necessary funds for its construction directly the estimates are sanctioned.

The "Indian Survey Syndicate," formed in London, has deputed an engineer to carry out the necessary surveys for a broad gauge line from Deesa to Umarkot, and from Hyderabad (Sind) along the left bank of the Indus to Rohri, including a bridge over the Indus at Kotri.

The Southern Mahratta has several meter gauge projects in hand, and the surveys are nearly done.

Existing lines are in many cases partially crippled owing to the non-existence of feeder lines, want of roads, etc., and this is especially the case during the rainy season, when the country between the trunk lines and outlying towns, is flooded for hundreds of miles at a stretch.

NUT LOCK.

CALCUTTA, Aug. 8, 1893.

Apropos of this letter we add the following from the London Economist:

It has been announced in the *Official Gazette* that the government of India have determined to afford additional encouragements for the investment of private capital in the construction of branch lines and extensions of existing railroads, and is now prepared to offer the following concessions: (1) The free use of land; (2) the provision of rolling-stock, and the maintenance and working of the new lines at favorable rates by the main line administrations; (3) the free use of surveys, etc., made at state expense; (4) the carriage of stores and materials over state lines at favorable rates; (5) the grant of a limited rebate from the main line earnings toward insuring the proprietors of the new lines a dividend of 4 per cent. per annum on their approved capital expenditure. Further, it can be legally arranged, authority will be given to charge the capital account of the branch railroad during construction with such a sum as will suffice, with any net receipts from traffic, to pay interest at the rate of four per cent. per annum on the paid-up capital, and it is announced that the question of applying to Parliament for power to recognize such payment in respect to Indian undertakings is under consideration. The Government, moreover, is prepared to undertake the construction by the Department of Public Works of branch lines or extensions on behalf of persons who may have provided the necessary capital. It is not, however, its intention in every case to grant the maximum concessions here specified. Each project will, it is stated, be separately examined, and be treated on its merits, and no concessions will be given for any project unless it appears to possess reasonable prospects of financial success. It is stipulated also that ultimate control over the rates and fares charged by the new lines shall be retained in the hands of the Government.

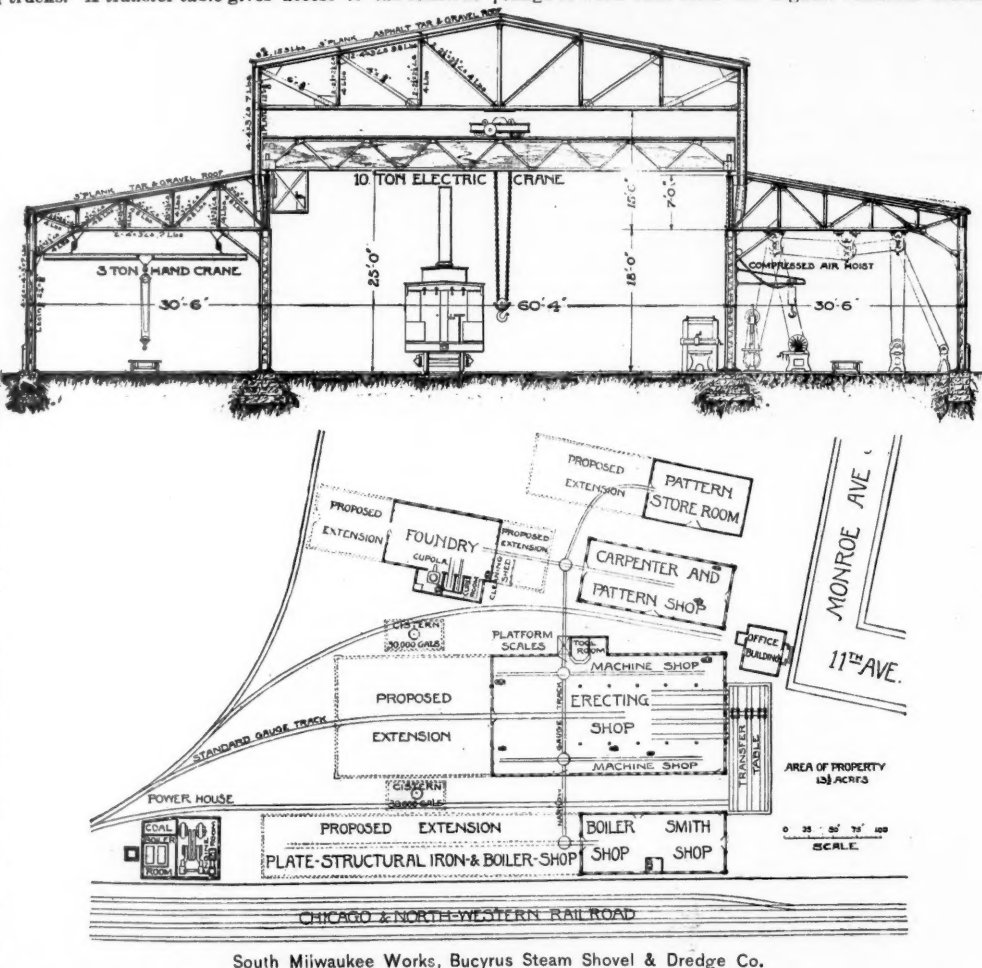
The South Milwaukee Works of the Bucyrus Steam Shovel & Dredge Co.

This company was established ten years ago at Bucyrus, O., but, having outgrown its garments, has moved, bag and baggage, to South Milwaukee, Wis., where it has built a large and complete plant on the line of the Chicago & Northwestern Railway, 10 miles south of the city of Milwaukee. The ground covered is 15 acres, including the shops and yards and the ship yard on the harbor, where good dock facilities are provided. A belt line railroad connects the main works and the ship yard. The plans and cross-section will show the arrangement of buildings which are brick, steel and glass, as follows: Offices, 40 x 60 ft., three stories; main building, 120 x 240 ft., with overhead traveling electric crane the entire length; smith shop; plate and structural iron shop; foundry, with overhead traveling electric crane; pattern shop; carpenter and wood shop; pattern store house; general store house; power house. The works are planned with a view to systematic extension, and the capacity can be more than doubled without destroying the general plan. Standard gauge tracks connect all the buildings, and a narrow-gauge track runs through the yards for hand trucks. A transfer table gives access to the construc-

tion to the cupola platform. An air cylinder having a tubular plunger is sunk in the ground and operates the elevator platform by direct lifting. Compressed air is also used for blowing out cylinder castings, and for testing small engines in the erecting shop. The compressed air is furnished by a duplex pump of the American Air Brake type, as used on locomotives. This is placed in the engine room, and a receiver kept charged at all times to the requisite pressure. There is no accumulator, and the apparatus is entirely automatic in its action.

The officers of the company are: Wm. Hamilton Harris, President; H. P. Eells, Vice-President and Treasurer; A. B. Stetson, Superintendent; W. B. Crittenden, General Manager; A. W. Robinson, Chief Engineer; J. M. Millman, Secretary.

The work executed by this company is divided into five leading specialties, as follows: Steam shovels, light dredging machinery, heavy dredging machinery, railroad and locomotive cranes and wrecking cars, placer mining machinery, Bucyrus amalgamator system. Under these headings is included a great variety of auxiliary appliances and machines connected with similar work, such as centrifugal pumps, ballast unloaders, pile driving machinery and machinery for public works. The range of work runs from the highest sectional steam



tion tracks in the end of the main building. The buildings, except that for the office, are one story, heated by the hot-blast ventilating system.

Electricity is used as the sole means of distributing power throughout the entire plant, because: It permits of complete isolation of the boiler and power-plant from all of the buildings; permits the ready and convenient distribution of any desired amount of power to any desired place and at any desired speed; avoids the wear and tear and loss of power on machines that are used occasionally or intermittently; lends itself to a variety of subsidiary uses such as electric light, electric welding, electric traveling cranes, electric portable drills, etc. The power is supplied by two multipolar slow speed generators, each of 150-H. P. (one of which is a reserve), these are driven by a Corliss engine, and the power is distributed from a central power house to the various localities as follows:—two motors 15 H. P., machine shop; two motors, 5 H. P., boiler shop; two motors, 5 H. P., pattern shop; one motor, 15 H. P., smith shop, blower; one motor, 15 H. P., cupola blower; one motor, 5 H. P., casting shop; three motors, 4 to 12 H. P., foundry crane; three motors, 5 to 15 H. P., erecting shop crane, making a total of 15 motors and 166 H. P.

The roof of the main building is 120 ft. span, divided into one central span 60 ft. and two side spans of 30 ft. One of the side spans is used as a machine shop for the lightest tools, the heavy tools being placed out along the edge of the central floor, so as to be under the field of the overhead traveling crane. Under the side span, when work is too heavy to be lifted by hand power, compressed air hoists are suspended from light jib cranes attached to the wall, or to the pillars of the building. Compressed air is used for the foundry hoists

shovel, capable of being transported on a mule's back, to the largest seagoing dredge of 10,000 cu. yds. capacity, and the dredges that have already been built number over twenty sizes, including some of the most powerful in the world.

Supercarburized Rails.

The old idea of producing a rail the top of which shall be hard and the foot soft and tough is again brought forward in a patent granted to the late H. A. Harvey, dated Oct. 17 of this year. In Mr. Harvey's specifications he says that the object is to economically produce steel rails tough enough to withstand breaking strains and yet hard enough to wear well. This result is secured by making a rail in which the upper part of the head has .5 carbon, the lower part of the head and the web from .25 to .4 and flange less than .2 carbon. This rail is made from a bloom which has been suitably supercarburized on one side and suitably decarburized on the other. The bloom is made in the ordinary way from steel containing say .3 carbon and not more than .4. The supercarburization and the decarburization may be effected by subjecting the bloom to heat while imbedded in a mass of granular material arranged in three strata, the whole in a suitable chamber contained within the heating chamber of the furnace. The side of the bloom to be decarburized is imbedded to a depth of, say, 1 in. in a stratum composed of sand and fine iron ore. The side to be supercarburized is imbedded in a layer of carbonaceous material firmly compressed against the bloom, while the middle portion is surrounded by a stratum of fine clay, separating the other strata. In rolling the supercarburized portion is spread thinly over the surface of the head of the rail, while the de-

carburized portion is formed into the flange. The percentage of carbon present in the upper part of the head of the rail will be greatest at the surface and will gradually diminish from the surface inward.

A Girder in the Broad Street Station of the Pennsylvania Railroad.

In the *Railroad Gazette* of Aug. 4 was a supplementary article on the extension of the Broad Street Station of the Pennsylvania Railroad, in Philadelphia, in which

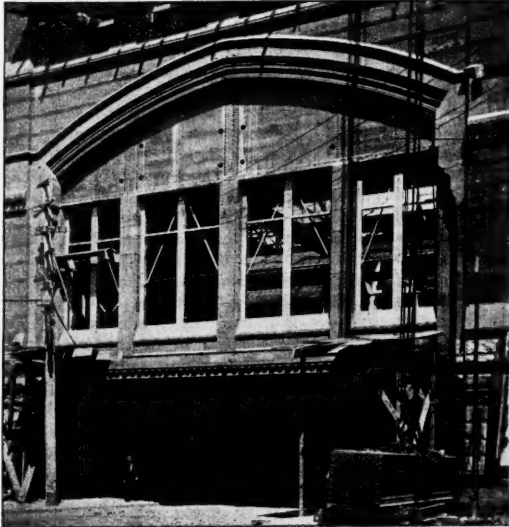


Fig. 31—58-Ft. Triple Plate Girder—Broad Street Station.

appeared (fig. 30) a view of the heavy triple plate girder, 58 ft. 1 in. span, 10 ft. 6 in. deep, and weighing 110,780 lbs., which spans Fifteenth street and which now carries the south wall of the new head-house. Fig. 31, in this issue, shows this girder as it appeared on Sept. 3, or shortly after the commencement of the wall which it is to carry.

Already the hand of the architect has begun to show itself, and we have an arch, evidently inadequate to the load which it appears to, but does not, support, and itself apparently (but of course not actually) supported by three columns which are in fact suspended from the girder, but which appear to rest upon the insufficient beam which in reality is suspended from them.

Recent years have seen great advances in the building art in the direction of greater integrity, but there is evidently still much left for succeeding years to accomplish. The arch, with supporting columns between its abutments, which our architects now so commonly affect, is bad enough, but when those columns (in this case really suspenders as designed by the engineer, but covered with terra cotta in courses so as to look like compression members) are made to pretend to stand upon shallow terra-cotta beam, it would seem as if decorative insincerity could go no further. The girder will also be covered with terra cotta, but what impression this covering is intended to convey we are not informed.

Despite such features as that here criticised, the new building, as a whole, will form a very imposing feature of the modern Philadelphia. It will not only be a fitting companion piece to the new and very handsome terminal of the Reading Railroad at Twelfth and Market streets, but will also furnish, in connection with that structure, a most striking and interesting contrast, for, while the two trainsheds are much alike in their salient features, the two head-houses are about as widely unlike in general design, in detail, in color and in the amount and character of ornamentation as two such buildings could very well be.

English Dining Car Kitcheners.

The cooking arrangements on the new corridor car trains now running upon the main lines between England and Scotland have attracted considerable attention, and American railroaders may be interested in seeing some details of what is considered good practice abroad.

The kitcheners on the London & Northwestern trains to Edinburgh and Glasgow have all been specially designed for the new cars, by the makers, Messrs. James Slater & Company, of London; but after a few months practical working they are now being improved upon in several important details, for which actual experience alone could show the best requirements. The ranges now in use comprise each a roasting oven, hot closet, etc., also an arrangement for grilling, the burner for which is divided into two separate lengths of different sized pipe, so as to give—by operating one or other, or both—three degrees of heat without attempting to regulate by turning a tap a little more or less. The fuel used for cooking is derived from the ordinary compressed gas cylinders already in position under the carriage frames, in which is stored the compressed oil gas employed for lighting the cars.

The improved kitchener which will be used in the dining cars on this line for the future is illustrated in the cut. On the right is the boiler, employed for heating the car throughout, the stack of circulating pipes being seen at the back. The roasting oven is on the left at the bottom,

	Line open for passenger traffic.		Worked on absolute block system.				Worked on other telegraph systems.		Single lines worked under.		
	Double.	Single.	Double line.	Single Line.			Double line.	Single line.	Single engine system.	Train Porter system.	Train staff system.
				With train staff system.	Without train staff system.	Electric train staff or tablet system.					
	Miles.	Miles.	Miles.	Miles.	Miles.	Miles.	Miles.	Miles.	Miles.	Miles.	Miles.
England and Wales...	9,167	4,945	9,103	2,890	42	1,020	58	29	213	1	151
Scotland.....	1,267	1,639	1,265	175	281	480	1	4	423	1	290
Ireland.....	609	2,341	680	504	395	22	18	185	538
United Kingdom...	11,043	8,245	10,953	3,569	376	2,495	81	51	821	2	979

and over it is a hot closet. Above that is a grill (heated from above instead of below as usually the case with coal fires), and still above is a small tank kept filled with water which is heated by the waste warmth from the grill.

The waste heat from the oven serves to warm the hot closet. The hot plate, lying in the middle of the apparatus, between the boiler and hot closet, is fitted with a number of automatic burners, each having a pilot light. The mere putting on or taking off the weight of a saucepan or other vessel serves to automatically open or close a gas valve to each burner, admitting or shutting off gas as it is required, without any trouble of turning a tap or handle.

The oven is provided with a special form of thermometer, built into the door; and the door panels both of oven and hot closet are lagged with polished mahogany strips, secured by polished brass bands, thus giving it a very strong and "engineering" appearance—quite different from the tinplate aspect usually seen in cooking ranges. Indeed, the whole arrangement savors more of the engineer or mechanic than the ironmonger, and no inconsiderable amount of machinery is to be seen at the joints and elsewhere, in order to secure an accurate fit.

Train Accidents in Great Britain in 1892.

A condensation of the British Board of Trade's Railroad Accident Report for 1892 was published in the *Railroad Gazette* of May 5 last, page 344. Besides the regular report a summary of its salient features is now issued annually, and this summary, for 1892, by Sir Courtenay Boyle, one of the officers of the Board, has just been issued. There were five train accidents in which passengers were killed. The worst was that at Thirsk, Nov. 2, where the signalman was unfit for duty because of bereavement. At Esholt Junction, June 9, five were killed, and five at Bishopsgate (London), June 14. Besides these five accidents, five others resulted in the death of one or more employees each. Thus, there were in all 10 fatal train accidents, less than one-third the average number in the United States in each month of 1892. Our total for the year was 385, or say 0.44 fatal accident per million train-miles, assuming that the figures in Poor's Manual afford an approximate basis from which to calculate an average. The train mileage of the English roads for the year was 327.8 millions, so that the average in the United Kingdom was 0.03 fatal accident per million train-miles.

The number of passengers killed, 21, was equal to 1 in 41,163,589 carried; and the other usual computations of this kind are shown in the report; but these figures are of but slight value for comparison, because the passenger mileage is not given and season ticket passengers are not included. Moreover, the fluctuations from year to year are very great, thus: 1889, one in 8.8 million; 1890, one in 45.4 million; 1891, one in 16.9 million; 1892, one in 41.2 million.

The number of accidents inquired into by the officers of the Board was 43, considerably less than ever before and 14 less than the average number for the last five years. The list of causes of these foots up 93, many accidents being due to two or more causes. The largest items in this total, next after negligence in operating (38), are: Insufficient or inadequately enforced regulations, 14; excessive speed, 9; insufficient establishment, long hours or inexperienced servants, 9. It is of interest to compare this list with that for 1882, which shows: Negligence, 91; inadequate or unsuitable brake power, 22; excessive speed, 22; defective signals or locking, 15; defective system for securing intervals between trains, 12; fog or storm, 11; and insufficient or inadequately enforced regulations, 10.

The number of employees killed in shunting operations was 158, which is 32 more than the average for the previous five years; and of these 19 were in coupling or uncoupling, one less than the average for five years.

The report contains the above table, showing the length of double and single line in the United Kingdom open for passenger traffic on Dec. 31, 1892, and the length of such lines worked upon the various systems;

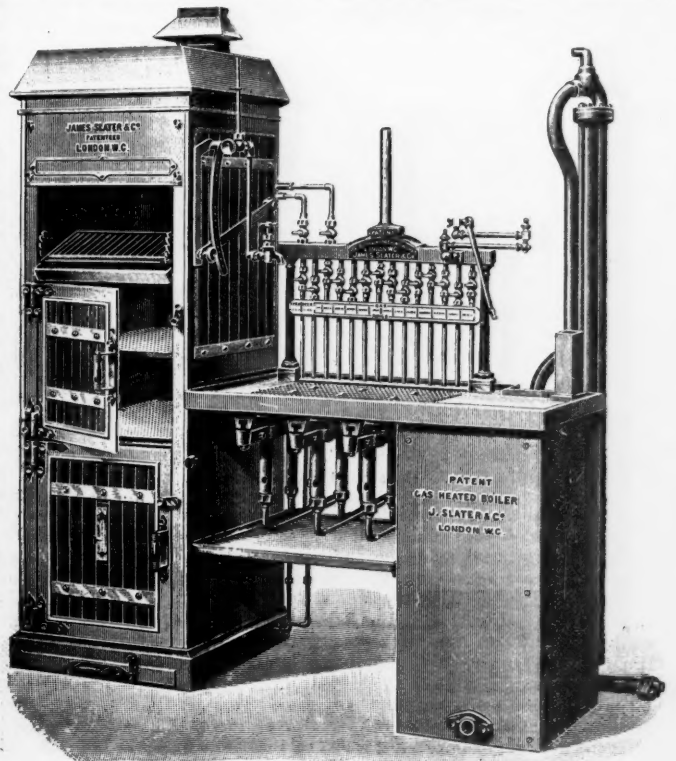
On Dec. 31, 1892, about 90 per cent. of the passenger train vehicles were equipped for the operation of power brakes. Following are extracts from the concluding chapter of the report:

Railway accidents are dealt with in this report mainly from two points of view, (1) the safety of the traveling public, and (2) the safety of the men employed in working the traffic. . . . As regards train accidents the number of passengers killed during the year shows a rather large increase on that of the preceding year; this is caused by three serious accidents on the Great Eastern at Bishopsgate, on the Midland at Esholt Junction, and on the North-Eastern near Thirsk, in which altogether 19 passengers were killed. The actual number of accidents to trains, however, shows a notable decrease during the year; those in which official inquiries were ordered by the Board of Trade being far below the average number of previous years. The number of cases of collisions with buffer-stops, or with vehicles standing close to the stops, due to trains entering stations at too high a speed, which had recently been increasing, shows a decrease on that of last year.

The Board of Trade have continued to urge upon the railway companies the recommendation of their inspecting officers that the use of continuous brakes on trains when entering terminal stations should be forbidden, except in cases of emergency, and correspondence on this subject is still proceeding with the Associated Companies.

In connection with the two serious collisions at Derby Junction on the London & North-Western, and at Esholt Junction on the Midland, in both of which cases trains were allowed to approach simultaneously upon converging lines, the Board of Trade have communicated with the Associated railway companies as to their mode of working at junctions, and as to securing a more uniform system of signaling trains; and there is reason to hope that alterations may be introduced to prevent the recurrence of accidents arising from this cause.

Two cases of the failure of communication cords on passenger trains occurred during the year. Both were cases of fatal accidents to passengers who fell out of the railway carriages in which they were travelling, and in each case the cord was pulled by a fellow passenger and failed to act. In the first case, which occurred on the Great Western, the failure was attributed by the company to the fact that at the time the cord was pulled the train was passing round a curve, and the cord, being on the inner side, slackened to such a degree as to render it, at the moment, useless. In the second case,



English Dining Car Kitchener.

on the Midland, the cord was tested by the company's officials, both before and after the accident, and found to act properly, and they attributed the failure to the circumstance that the passenger who attempted to use it did not pull the cord properly, owing to the excitement and agitation of the moment.

Further correspondence has taken place with the railway companies on the subject of the employment in excursion trains of inside handles, especially those handles which open the doors of carriages when a down-

ward pressure is applied; these have proved to be a source of danger to children, and measures have been taken by some of the companies to avoid such a danger as far as possible. . . .

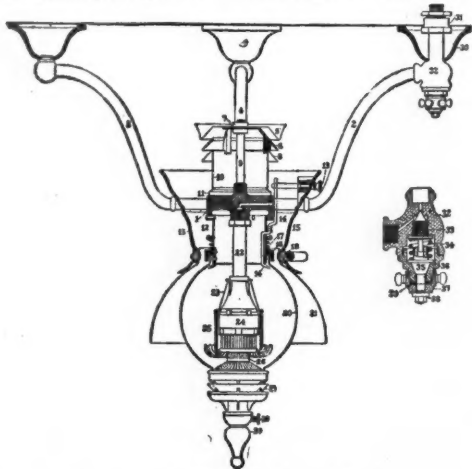
The author of the report gives the causes of the 48 principal accidents to the extent of a paragraph or two for each accident, with the remedies proposed by the Inspectors. This part of the report gives a very good epitome of the requirements which the Government Inspectors lay down when they have occasion to make an investigation. Two of these requirements, that hand-brakes shall be used in entering a headhouse station, and that a train must be protected, by more than one home signal, are touched upon in the summary printed above. Evidently the Inspectors are determined to prescribe safe regulations even to the extent of recommending safeguards against failure of safeguards indefinitely; but apparently the railroad officers do not agree with them. With block signal stations very close together it is doubtless possible for a junction signalman, in many cases, to hold all trains on one line back a whole block, while he passes a train on the other line, without causing very great delays; but there must be many junctions where such a plan would cause delays and to such an extent as to make the aggregate inconvenience a serious matter; and the realization of this by the railroad officers presumably is the reason why they persist in turning a deaf ear to the Government's admonitions. Certainly there are junctions in this country where the block sections are constantly occupied for several blocks in all directions for a considerable time each day, and where the Inspectors' rule would simply keep a large number of trains one block farther back than they otherwise would be.

Judging from American experience with the quick action Westinghouse brake the difficulty at terminal stations ought to be curable by discipline alone. The English recommendation that hand brakes be used is based mainly on the theory that there should be a reserve of power for emergencies; but with the new triple valve there is such a reserve, while still using the "service application" for the ordinary handling of the train. The use of the hand brakes means, practically, lower speed and consequent loss of time, but low rates of speed are enforceable, while still leaving the train in the hands of the engineman.

It appears from one of the inspector's reports that on the Great Eastern it is the custom, except at junctions, to keep the signals normally at "all clear." But for this practice the collision in London, June 14, killing five passengers, might, in the inspector's opinion, have been prevented.

Improved Lamp for the Frost Dry Carburetor System.

Herewith is illustrated the Railroad Lighting & Manufacturing Company's No. 3 deck lamp of the Frost dry carburetor system, which is their latest design. It is especially designed to burn the vapor of volatile oils



New Lamp for Frost Carburetor System.

of petroleum. We have more than once described the Frost dry carburetor system, and it is unnecessary to restate here the facts now so well known about the construction and operation of the carburetor.

The gas reaches the lamp through the arm union, 31, and the valve body, 32, where it is controlled by the valve wheel, 37, and the valve needle, 33, on its way through the arm, 2, to the gas body, 1, and thence through the nipple, 22, to the burner, 24.

The burner is the Gordon-Mitchell inverted type, surrounded by a small porcelain cylinder, 25; at the bottom of which combustion takes place, as indicated by the flame-like lines. The air necessary for combustion is supplied by a so-called injector, 27, at the bottom of the lamp, which supplies it to the air controller, 26, through which it passes to the burner. The air is required to pass outside of the porcelain cylinder by the air deflector, 23, thus producing a flame of the form desired for high illuminating power. The injector, 27, and controller, 26, are fastened together, and when the latch, 28, is pressed they drop so that a match may be inserted and the lamp lighted. The wind cap, 5, and its component parts, 6 and 8, serve to protect the lamp

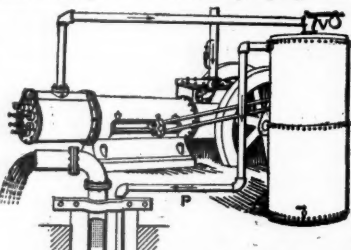
from drafts and to give it a better appearance. The shade, 21, is released by pulling to one side the clamp, 18, and the globe is removed by deflecting the globe finger, 14. The spring, 17, insures a tight joint at the top of globe, which presses against asbestos rings.

The lamp is supported by four arms, two long arms, 2 and 3, extending crosswise of the car and two shorter arms, marked 4, with a binding rod, 9, to unite the wind cap, 5, with the gas body, 1. The lamp is 20 in. between centers of arms, measured diagonally, and is 22 in. drop. The top of wind cap is 3 in. from smoke bell and 5 in. from the ceiling of the car. The shade is 10 in. and the globe 6 in. in diameter. The lamp is artistically designed and decorated and the workmanship is good. The company's bracket and vestibule lamps are supplied with a modified type of the argand burner.

Pohlé Air-Lift Pump.

Hydrostatics and pneumatics afford many interesting and curious phenomena, which have been at the time of their discovery probably even more surprising than those of electricity at the present day. Archimedes, Hiero's fountain, Springel's air pump, the siphon, the hydraulic ram and the inspirator are a few familiar illustrations, the principles of which have been applied to industrial purposes. Springel, by flowing quicksilver through a tube with a Y connection, exhausted the air from a vessel. Later, water under pressure was employed to accomplish the same result, and still later, by changing the position and shape of the opening, the same principle was used to compress air as in the laboratory blast pump. By substituting air or steam under pressure for the water, *i. e.*, exchanging the places of the agents employed, the same principle was utilized to pump water as in the hydraulic ejector and the common inspirator. By using steam instead of water, blowers have been made such as are employed in furnaces.

None the less interesting is a device perfected by Dr. J. G. Pohlé, of New York, which, though embodying the same general principles and mechanism of the others, also presents some other features. This device is called the Pohlé air-lift pump and consists of two pipes, one to convey the water forced up from a well, and the other, a smaller pipe, to carry compressed air to the bottom of the well and to direct it into the bottom of the water pipe. The accompanying illustration shows



the arrangement of these pipes. There is an engine, a compressor and a reservoir from which the air is conveyed to the bottom of the well and directed into the pump at B. The clear spaces represent the air rising in the pipe, and the dotted spaces the water as it ascends. The immersion of the pipe is L B. Little else need be said in explanation of the pump, as its mechanism is extremely simple, having no valves, pistons or other mechanism.

Though this device is in construction very similar to the ordinary ejector it does not depend entirely upon the principles of inspirators and ejectors for its operation. The working of an ejector depends upon the inertia given to particles of water by the air or steam as it escapes into the pipe. It will work with steam, while the air-lift pump will not. The former will work in shallow water with the end of the pipe alone immersed. The latter requires an immersion proportional to the height that the water is to be lifted, and the greater the immersion the more efficient will be the pump. The one depends upon the impetus given to the water by the compressed air vapor; the other depends upon the buoyancy or displacement of the air. Water is made lighter by mixing it with air; and if the water in the tube be aerated it may be expected to rise to a higher level than that of the vessel in which it stands, and the difference of height will be proportional to the densities of the fluid in the tube and that of the vessel, and of the depth of immersion of the tube. It is this principle which increases the efficiency of the air-lift pump and enables it to pump water from a depth that could not be reached with an ejector. The height to which water can be raised will be as the specific gravity of the aerated column of water of the tube is to the column of water in the well, plus the kinetic influence and pressure of the air at the bottom of the tube.

The earlier types of air-lift pumps admitted air in small divided bubbles, but experience seems to have proved that the best results are obtained by admitting the air in large bubbles. When admitted in proper quantities the air fills the full cross-section of the pipe T, and forms little piston-like columns of air which alternate with columns of water. When the conditions are favorable the air does not bubble through the column of water, nor does the water run around the bubbles or columns of air, but both pass up the pipe in sequence. It is the practice to admit sufficient air to fill from one-third to two-thirds the capacity of the pump pipe or tube, the pressure varying with the depth of immersion. With very favorable conditions water has been raised 125 ft. with 35 lbs. of pressure. In this case the immersion must have been great.

Numerous patents have been issued for the same or similar devices. The earliest is said to have been granted to Capt. J. B. Eads in July, 1870, patent number 105,056. Another to one Mr. Frizzell in 1878, and others to a Mr. Stone, number 281,415, and to Smith & Cliff, number 323,458. Dr. Pohlé, the designer of the pump thus described, has also patented an engine dated December, 1892, which embodies the idea of introducing air in sufficient quantities to make columns of air the full size of the tube or pipe, under the belief that this feature gives greater efficiency by avoiding any tendency of the bubbles to pass through the water or of the water to run around the bubble. As these columns of air rise and the pressure diminishes, they expand, thus yielding the full efficiency in lifting power to the pump. In expanding they absorb heat from the water, thus reducing its temperature appreciably. The water is thoroughly aerated during its ascent, and any offensive gases or organisms the water may contain are largely removed or destroyed. When the work of the pump ceases, the water sinks to its natural level, and there is no danger of freezing.

The use of the Pohlé air-lift pump is not limited to water alone; in fact, its greatest merit lies in its simple construction and its capacity to do what ordinary steam pumps cannot do economically. The air-lift pump lifts and ejects anything that the pipe will admit. Sticks, mud, sand and stone do not clog it nor disturb its action. Stones 2 and 3 in. in diameter and weighing more than a pound have been raised by its action. It is especially serviceable for pumping the acids or alkaline and saline substances and filthy liquids when a tube immersion can be had, for there are no valves or working parts to be destroyed or choked up. It may be employed to sink wells in sand and gravel, as it raises such materials with the water. It is claimed that the air-lift pump, by ejecting sand, stones and refuse matter, thereby increases the flow, which seems reasonable.

Much is claimed for the air-lift pump in economy, and while it may be admitted that probably the efficiency obtained from compressed air of the storage reservoir may be higher than is obtainable from any compressed air engine, yet it may be greatly doubted if it can give any such efficiency as a steam pump when measured in pounds of fuel burned. Fuel must be burned to store the energy of the compressed air in practically the same machine that is used to pump the water; and there is also heating in consequence of such compression which is lost by radiation from the reservoir and compressor. Then the friction and leakage of air must be taken into account, which altogether would, without much doubt, be to the disadvantage of the air-lift pump. But it is not necessary to compare the economical side of the two pumps. They are utterly different, and each has its sphere to work in.

Mr. Alex. E. Schnee, 48 Exchange Place, New York, the representative of the air-lift pump, has in his possession many testimonials with regard to its efficiency and economy. It cannot be doubted that, with deep immersion, where no pressure is needed, it is an excellent device for pumping water or other fluids, and especially of those fluids which tend to destroy or damage the ordinary plunger or piston pumps employed for such purposes.

Tests of Springs Made from Z Section Rods

Some tests of the Timms springs, which are made from Z section rods, have been made by Professor Unwin, and the results are given in the tables below. The aim of the designer of springs of this section has been to get greater resiliency, by putting the thick parts in different places, and also to prevent the springs from taking a permanent set. It is claimed that more range of deflection and load can be obtained with the same weight of metal by using the Z section. The outer thick parts come into contact when the spring is driven home, but not the inner ones; this, it is claimed, will prevent breaking. The double flange girder volute, shown in fig. 3, gives from 30 to 40 per cent. more power with the same weight, and the friction between the coils of double coil spring is avoided.

The section fig. 1 represents a type of spring used for bearing purposes, fig. 2 that employed for locomotive drawbars, and fig. 3 for buffing, all, of course, being used in compression. A considerable number of these springs is now used under English and other foreign passenger and freight cars. For passenger service an extra spring is placed alongside the two commonly used at each end of the bogie truck bolster. This extra spring is made from 1 in. to 1 1/4 in. shorter than the other, and under heavy

weights on the car comes into play and acts as a relief when passing over rough spots in the track. The result is very satisfactory.

The comparative tests by Professor Unwin were made with a 100-ton testing machine at the South Kensington Central Institution. The flange girder sec-

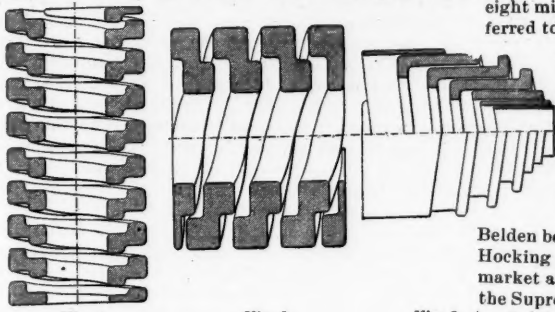


Fig. 1.

Fig. 2.

Fig. 3.

Springs of Z Section.

tion is shown in the illustrations. The concave girder section is one that has no flanges, but is thick at the sides and thin at the center of the section.

Dimensions of the Spring Tested.

	Double coil springs.	Double coil nest springs.	Flange girder volute.	Concave girder volute.	Plain volute.
Outside diameter, inches.	4.375	4.5 and 3	6.375	6.3125	6.25
Hole, inches.	2	3.125 and 2	2.625	2.625	2.625
Length, light, inches.	6.625	6.625	10	10.125	10.25
Length, home, inches.	4.825	4.18	6.31	6.195	6.18
Weight, lbs.	14	13	30.5	27	32.5
No. of coils.	6	6 and 3/4	4.5	4.5	5

Summary of Tests.

Form of springs.	Description.	Ultimate resistance in tons.	Range in inches.	Energy stored per pound of weight, inch-tons.
Cylindrical.	Double coil nest spring of square section	6.125	1.78	.385
	Plain girder	4.85	3.9	.335
Volute.	Girder	5.125	3.67	.412
	Concave girder	5.6	3.95	.508

The Hocking Valley Bond Suit.

The decision of the General Term of the Supreme Court in New York was lately rendered reversing the judgment of the trial court, which dismissed the suit brought by James J. Belden against Stevenson Burke and others. This suit involved the wrongful disposition of six millions of bonds of the Hocking Valley road. The higher court holds that a large amount of bonds of this railroad were wrongfully disposed of and the proceeds used in violation of the covenants contained in the mortgage, and for the personal profit of the officers and directors of the road under its former management, who are declared to be guilty of a breach of trust, and fraud, in the transaction. The principles laid down by the General Term are doubtless sound, and the result will be wholesome. A statement of the facts must interest purchasers of railroad and other bonds.

The Organization and Issue of Bonds.—In 1881, Stevenson Burke and his associates conceived the plan of buying up the stock of the Columbus & Toledo, the Columbus & Hocking Valley and the Ohio & West Virginia railroads, consolidating them into one company, with a capital of \$20,000,000 and issuing a large amount of bonds secured by a trust mortgage. The plan involved the sale of the bonds of the new company and the appropriation of a part of the proceeds to the payment for the stock of the constituent roads purchased and a division of the balance among the promoters. The plan was carried into effect by Stevenson Burke and associates executing their notes for \$6,000,000, which Drexel, Morgan & Company discounted. The proceeds of discount were used in the purchase of the stock of the three railroads, which was immediately deposited with the bankers to secure the loan.

The new company, known as the Columbus, Hocking Valley & Toledo Railway Company, was then organized. Stevenson Burke and associates became the owners of the new stock and officers and directors of the new company, and mortgaged all the property of the new company, giving a trust mortgage to the Central Trust Company to secure an issue of \$14,500,000 of bonds, \$6,500,000 of which were reserved to take up outstanding bonds of the primary roads, and the balance thereof, \$8,000,000, was held as security by Drexel, Morgan & Company and Winslow, Lanier & Company, and afterward sold and the proceeds appropriated to the payment of the notes held by the bankers, and the balance paid over to Burke and others. This plan was developed in apparent compliance with all the forms of law.

Furthermore, the mortgage recited a resolution of the railroad company, in substance, providing that eight millions of bonds should be sold and disposed of, and the proceeds supplied for the purpose of double tracking, equipping and increasing the transportation facilities of the road, and in purchasing such real estate and other property as the interests of the company should require, and contained a distinct covenant that the said amount of bonds were to be disposed of according to the stipulations of the mortgage.

Former Litigation.—Burke and his associates con-

tinued in control of the company until 1887, when upon the election of new officers the facts as to the fraudulent disposition of the proceeds of the bonds became known. The company under new management then brought a suit against Burke and other persons interested with him, to compel them to account for the proceeds of the eight millions of bonds. The issues in the suit were referred to James C. Carter, E. W. Kittridge and Lawrence Maxwell, Jr., as arbitrators, who decided, after an elaborate trial, that the railroad company could not maintain an action against its former directors for wrongful disposition of money or other property, when it appeared that such disposition was assented to and ratified by all the stockholders of the company at the time of the transaction.

Suit Brought by James J. Belden.—In 1883, Belden became the bona fide owner of 50 bonds of the Hocking Valley road by actual purchase in the open market at current rates. In 1890 he instituted a suit in the Supreme Court in New York City on behalf of himself and other bondholders against Burke and his associates, Drexel, Morgan & Company and Winslow, Lanier & Company, to compel on accounting for the proceeds of the \$8,000,000 of the bonds misappropriated by them.

Belden claimed that, had the real purpose of the organizers of the railroad company been expressed in the mortgage, that instrument would have been on its face invalid and inoperative, and its bonds unmarketable, and that it was only by a false pretense of actual compliance with legal form and by the false representation that the proceeds were to be used for improvements, betterments and additions, that the bonds became marketable at all and the mortgage valid in favor of bona fide investors.

The Belden suit came on for trial at the special term of the Supreme Court of New York before Judge Ingraham, and resulted in a dismissal of the complaint, the judge holding that inasmuch as Winslow, Lanier & Company, the first holders of the bonds, were aware of the disposition of the proceeds, and participated and assisted in such disposition, they could not enforce the covenants contained in the mortgage, and that subsequent purchasers or holders of the bonds stood in no better position than the original holders.

The General Term Opinion.—The General Term, upon an appeal by Belden, declared that to hold that subsequent purchasers of bonds were affected by the action or knowledge of original bondholders was to express a startling proposition, in view of the fact that five thousand millions are invested in the capital of corporations in this country.

The Court points out that the idea was conceived to attract investors with the assurance that the proceeds of the bonds were to be used in double tracking, equipping and improving the transportation facilities of the company and purchasing real estate, for such a covenant implied that in addition to the equity of the corporation over and above the mortgages on the primary roads, the security would embrace the improvements and betterments, thereby enhancing its value. The learned Judge says in his opinion:

"A railroad is an artificial structure. It deteriorates by use and requires frequent renewals. Its earning capacity depends on the condition of the road for safe and speedy movement of trains, adequate rolling stock and the proper and needful facilities for transportation. Business from which revenue is derived is invited by the character of the transportation facilities supplied. The creditor who loans his money, therefore, upon the security of such property and upon the condition or covenant that the money shall be applied in improving and increasing the value of the property, is vitally interested in the application of the money in accordance with the agreement, which has for its purpose the protection of the loan. But the promise that the mortgage contains was not kept, nor was it ever intended that it should be. Not a dollar of the proceeds of the \$8,000,000 bonds was applied in the direction covenanted in the mortgage."

For this violation of the covenant contained in the mortgage the Court holds that the defendants, Burke and his associates, are liable distinctly on the ground that investors have the right to look at the bonds and the mortgage, which is a matter of public record, for information, with full assurance that the terms and conditions contained therein can be enforced. The Court further declares that it would be a public misfortune if it should be determined that these sources of information are not reliable and quotes the language of Chief Justice Waite of the United States Supreme Court:

"Railroad bonds are a kind of public funds. They are put on the market and dealt in as such. When a dealer finds such bonds not yet due in the hands of the company, with the proper certificate of the mortgage trustee upon them, it has, I think, always been understood in the commercial world that he might buy in good faith with safety."

The court further holds that the conduct of Burke and his associates was fraudulent, using the following strong language:

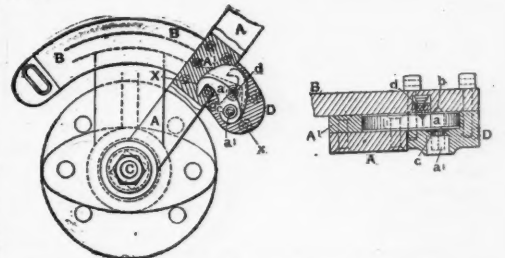
"Such conduct is inconsistent with upright dealing, but consistent with the intention to deceive. The result of the transaction was a fraud on the trustee, for by reason of it there was put upon the market bonds bearing its certificate, which operated to assure investors of the bona fides of the entire transaction, when in truth that was wholly wanting."

The decision of the General Term reverses the judgment and orders a new trial, with the probable result that the principles laid down in the opinion will govern upon such new trial and lead to a final judgment against Burke and his associates, which shall compel an accounting for the proceeds of the bonds in question.

A Throttle Lever Lock.

To prevent unauthorized persons from opening the throttle of locomotives, a German inventor, Mr. J. Hochstein, Wanne, Germany, has devised a lock, shown in the engraving, which can only be opened by such persons as have been furnished with proper keys by the railroad officers. It is not a very important detail and will probably never be used on locomotives, but may have some little interest and suggestion.

A hook *a* is pivoted upon a key post or key pin *a'*, figs. 1 and 2, in a hollow forged lug *D*, which is fastened to the throttle quadrant *B*. This hook engages in a cavity in a plate riveted to the throttle lever *A*, when the throttle is closed. This plate *A'* is made to cover several inches of the lever on the inside between it and the quadrant to strengthen the throttle lever where cut away for rivet holes. The lever covers the cavity in which the hook engages and makes the hook inaccessible.



The cavity in the lug *D* is large enough to permit an upward movement of the hook of about 66 deg. so as to unhook from the lever. This hook is raised to the position shown on dotted lines turning a key with a triangular hole, which fits the key pin *a'* which is kept in place by the shoulder *c*, and is stiffened by its engagement in the quadrant at *b*.

When locked or unlocked the hook is made fast by the little spring bolt *d*, which, until it is depressed, prevents any movement of the hook. If the hook is down it cannot be raised by simply turning the key pin, but the key must have such a shape that it will depress the spring bolt. This connection is not shown in the illustrations. The key must be used to lock the throttle as well as to unlock it, so it leaves the lever free when running.

This locking arrangement might afford protection for locomotives in time of strikes by preventing strikers from operating the locomotive, and it might prove a source of annoyance by having the keys carried off by striking employees. This difficulty has been foreseen. The lock is constructed so it can be taken apart in a short time by unscrewing the three set screws that hold the lug and hook to the guide strap.

Railroads in India.

On the 31st of March last there were 18,042 miles of railroad in India. These lines are classified and compared with the mileage of 1892 as below:

	Standard.	Meter.	Special.	Total.
Lines worked by the state.	3,588 1/4	1,281 1/4	28 1/4	4,898 1/4
Lines worked by companies not owned by native states	6,263 3/4	5,296	51	11,610 3/4
Lines owned by native states.	523 1/4	815	165 1/4	1,504 1/4
Foreign lines.		58 1/4		58 1/4
Total miles open, 1893.	10,315 1/4	7,451 1/4	245	18,012
Total miles open, 1892.	10,103 1/4	7,171 1/4	288 1/4	17,563
Sanctioned March, 1893.	11,526 3/4	8,590	269 1/4	20,386 1/4

As there are about 270,000,000 people in India this gives nearly 15,000 per mile. On lines opened the cost per mile has been: Standard gauge, \$81,447; metre gauge, \$35,500; special gauges, \$15,626. The number of employees is given for the standard gauge as 139,387, of whom 3,569 were Europeans. On the metre gauge lines 65,373 were employed; of whom only 938 were Europeans.

The gross receipts, expenditure, and net receipts were as follows: The decrease in receipts, as compared with the previous year's figures, was due to the exceptional traffic of 1891, chiefly in wheat and seeds for export:

	Standard.	Meter.	Special.	Total.
1892.	Rs. 17,32,98,271	5,77,19,986	12,74,554	23,22,32,811
Difference.	-1,07,63,461	+27,09,112	-55,630	-81,09,979
Working expenses:				
1892.	Rs. 7,90,14,196	2,92,51,951	7,33,910	10,90,00,057
Difference.	-40,89,605	+1,69,701	-1,18,510	-40,38,414
Net earnings:				
1892.	Rs. 9,42,84,075	2,84,68,035	5,40,644	12,32,12,754
Difference.	-66,73,856	+25,39,111	+62,880	-40,71,565
Return (%) on capital outlay:				
1891.	5.98	5.04	5.42	5.76
1892.	5.47	5.26	6.92	5.43

The total number of passengers carried on all the lines was 127,456,913, or 4,601,576 increase, and of passenger miles, 5,226,107,973, or 43,116,283 increase. The total number of passengers booked showed an increase of 3.75 per cent. as compared with the number booked in 1891. The passenger mileage increased by 0.83 per cent., but the earnings from coaching traffic decreased by 0.12 per cent. The number of passengers booked per mean mile worked was 7,213, as compared with 7,211 in 1891. Of the total number carried, the two lowest classes of passengers constituted 97.37 per cent., the second class 2.24, and the first class 0.39 per cent. of the whole.

A portion of the decrease in earnings from "coaching traffic" was due to a decrease in the average distance traveled from 42.54 miles in 1891 to 41.34 miles in 1892. The average number of passengers carried in a passenger train was 209.31 on the standard gauge and 230.07 on the metre gauge.

The lowest average cost on the standard gauge of hauling one passenger one mile was 0.61 pie on the East Indian Railroad, on which the average sum received for this work was 2.70 pies. On the metre gauge the lowest

* The value of the rupee is taken at 50 cents.

average cost of hauling a passenger one mile was 0.06 pie on the Rajputana Malwa Railway, the average receipts on this line being 2.12 pies.*

Of goods the companies carried 26,334,232 tons, or 175,279 tons increase, the goods ton mileage being 4,233,381,249, or 205,611,182 decrease. The total tonnage of goods lifted showed an increase of 0.67 per cent. as compared with 1891. The total ton mileage decreased 4.63 per cent., and the earnings decreased 5.34 per cent. The number of tons of goods lifted per mean mile worked was 1,490, as compared with 1,535 tons in 1891. The decrease in earnings from goods traffic was chiefly due to a decrease in the average distance hauled, from 169.69 miles in 1891 to 169.76 miles in 1892. The goods traffic in the previous year was remarkable for the large exports of wheat and seeds; and, although the returns of 1892 show a considerable decrease under this head, the falling off in the earnings from the exceptional amount realized in 1891 has not been so great as was anticipated. The average goods earnings per goods train mile were Rs.4.79 (\$2.395) on the standard gauge, and Rs.2.82 (\$1.41) on the meter gauge.

The average distance over which a ton of goods was hauled was on the standard gauge 177.79 miles, and on the meter gauge 130.95 miles.

The traffic in grain and seeds taken together showed a decrease compared with the preceding year of 885,903 tons, or 11.22 per cent., the actual figures being, in 1891, 7,894,595 tons, and last year 7,008,692 tons.

The quantities of wheat carried by the important exporting railways during the past seven years were as follows. It will be seen how uncertain this traffic is:

	1886. Tons.	1887. Tons.	1888. Tons.	1889. Tons.
Great Indian Penin.....	553,362	485,175	523,782	272,594
Bombay Bar.....	146,235	42,572	92,997	87,264
East Indian.....	415,211	305,967	260,550	177,511
N. Western.....	249,829	130,714	298,602	422,870
Total.....	1,364,637	964,428	1,175,231	956,239
	1890. Tons.	1891. Tons.	1892. Tons.	
Great Indian Penin.....	313,459	544,877	388,180	
Bombay Bar.....	40,678	215,323	140,659	
East Indian.....	139,145	405,193	377,026	
N. Western.....	438,507	716,152	314,958	
Total.....	931,789	1,881,545	1,230,823	

On account of the fall in silver the interest payable on the guaranteed lines, which amounts to an average of 4.8 per cent. in sterling, is now equal to over 7.6 per cent., although the Indian Government could now raise money by a payment of a little over three per cent. Hence there is a net loss on the guaranteed lines of about 98 lakhs of rupees, which has to be made up by taxation.

Conduit for Trolley Wires.

At the Milwaukee meeting of the American Street Railway Association the Love system of underground electric conduits was described as in use in Washington. It consists of shallow yokes, with openings 14 x 20 in., bedded in concrete and connected by U-shaped slot rails. These rails have a side bearing of 1½ in. and project into the conduit 5 in. on the inner side. The trolley wire is hung about even with the lower edge of this slot rail and about 2 in. from it, out of sight and out of reach. The yoke and conduit are made shallow to avoid the necessity of removing gas and water pipes. The wire is fastened to insulators that are attached to the yoke by shoulder bolts, which allow 2½ in. longitudinal motion for expansion and contraction. Both the positive and return wires are carried in the conduit underneath the slot rails, so that no ground wire is necessary. Both wires are broken every 500 ft., but form a continuous path from end to end for the trolley wheel. Each 500-ft. section is provided with switches, so that it may be cut out if trouble occurs in it.

The trolley carrier is fastened underneath the cars and arranged to meet the irregularities in rounding curves. The trolley has an elbow movement, to allow for irregularities of track, and has two trolley cars on the bottom suitably insulated. The wheels are adjusted to move sidewise so that the trolley cars shall remain upon the wires.

The accumulations of snow and dirt are removed by attaching to any car an arm, to the end of which is adjusted a broom about the size of the conduit and thus sweeping it out. At the end of each hundred feet a manhole and trap is provided, into which the sweepings drop and from which they are removed in the usual manner.

One and one-half miles of this system have been built in Washington and have been in operation since the 4th of last March. It is a part of route using the overhead system and is connected to it, using the same wires under ground. It is said to have worked successfully from the day it was started, in moderately cold weather in some snow and ice, and often with much water running on the tracks.

After the Fair.

Now arises the question, What is to become of all the wonderful and interesting objects that were collected in the most wonderful and interesting fair that the world has ever seen. The collection of most interest to the greatest number of people who were at all interested in railroads (and who in America is not?) was that magnificent epitome of railroad development made by the Baltimore & Ohio Railroad. It is the intention of the company to keep this collection intact, except, of course, the modern locomotives and cars, and to make it the nucleus of a museum of railroad history. The proper place for it, then, is in the Smithsonian Institution, where it would vastly augment the collection already made in the Museum of Transportation. Baltimore is very anxious to get it, and the newspapers of that city are talking about a permanent building for it, with halls for

* A close approximation, at present values, gives 0.61 pie = 0.1 cent; 2.7 pies = 0.47 cent; 2.12 pies = 0.35 cent.

railroad conventions; but neither force, nor taste, nor historical learning, nor all combined, can make Baltimore a railroad center, or a point to which railroad men would go to hold their conventions. If the collection cannot be housed and properly taken care of by the United States Government at the Smithsonian, probably the next best thing to do with it is to give it to the Chicago museum, which has recently been provided for by the generous gift of \$1,000,000 from Marshal Field and smaller, but still large, gifts from George M. Pullman and others. Probably a good many of the exhibits will go into that museum, as, for example, the "Pioneer," shown by the Chicago & Northwestern Railway, the first locomotive to run into Chicago. There is a fitness in keeping this engine in Chicago, and yet it would be immensely more interesting and valuable as a part of such a collection as might be gathered at the Smithsonian.

The Intramural Railway people have no plans yet for the final disposition of the equipment of that road. The plant cost \$1,000,000, and 25 per cent. of the receipts was paid to the Exposition company. The percentage paid to the Exposition represents about the loss sustained by the railroad company. The total number of passengers carried by the road was 5,806,746; the best day was Chicago Day, when 126,000 were carried. A few trains were continued after the Fair closed, and will be operated as long as the traffic is a paying one. This will not be long, however.

The Movable Sidewalk is said to have been a financial success, in spite of all its troubles. Several schemes are being considered for establishing such plants in various places, but there is nothing definite at present. Before the line on the Casino Pier is removed sectional rails will be tried in place of the long, continuous flexible rails that were run on the periphery of the truck wheels. It is expected that the new rail will obviate the frequent breakages experienced with the old rail.

The large tandem compound engine, built by the E. P. Allis Co., of Milwaukee, that was exhibited in the power station of the Intramural Railway, will, with two or three others just like it, be sent to Philadelphia to be set up in the power station of one of the electric roads of that city.

Opening of the Lake Street Elevated Railroad, Chicago.

A general description of the structure, stations and rolling-stock of the Lake Street Elevated Road, of Chicago, was given in the Aug. 25 issue of the *Railroad Gazette*, and in the same article it was stated that the road would probably be opened for traffic sometime in September of the present year. The opening, however, was delayed for various causes, as noted in our news items in recent issues, until last Monday, Nov. 6. On Nov. 4 five trains of five cars carrying invited guests were run from the downtown terminus at Madison and Market streets to the present western end of the line at Homan avenue and return. Homan avenue extends along the eastern side of Garfield Park and is about four and a quarter miles from the Market street station. The road was opened for regular business on the Monday morning following.

The Lake Street Elevated road runs about midway between the Madison street cable line and the main western line of the Chicago & Northwestern Railway; its opening will affect seriously the traffic on the cable line, and it has been supposed that many of the lawsuits brought against the elevated road in the name of the people have been incited by those interested in the income of the cable road. The Lake street road does not extend far enough yet to affect much the suburban traffic on the Galena Division of the Northwestern, as the most of the latter's traffic comes from stations west of Fortieth street. However, as the elevated road is extended it must affect materially the suburban traffic of the surface road.

Elsewhere we show how the close connection between the Calumet Electric Street railroad that serves South Chicago and Pullman, and the southern part of Chicago, with the South Side Rapid Transit road and the cheaper fare, though somewhat slower time, is proving a strong competitor of the Illinois Central for the suburban traffic to and from the southern district. When the Lake street road is extended to a connection with the west side electric roads at Fortieth street there will be an exactly similar case, for the electric roads extend west parallel with the Northwestern through the large suburbs that have been built up along the line of the latter. If a close connection be made between the electric roads and the Lake Street Elevated the Northwestern will have in the combination a stronger competitor than has the Illinois Central, because the Lake street lands its passengers much nearer the center of the business portion of the city. The suburban business of the surface roads generally increase the profits of operating, so it is well for them, if they desire to hold this traffic, to watch closely the course of electric roads.

La Guaira Harbor Works, Venezuela.

At the International Maritime Congress held in London last July Mr. A. E. Cary read a paper on the works at the principal port of Venezuela, La Guaira. The coast is subject to heavy winds, the sea bottom is exceedingly steep and the momentum of the waves has to

be resisted over a small area. Gales of the hurricane type occur at intervals of from eight to twenty years. One of these occurred in 1837 with disastrous results on the works in progress. There is an almost incessant, heavy surf, and the average number of days a year in which it was impossible to work was about 100. In 1885 an English firm, Messrs. Punchard, McTaggard, Lowther Co., got a concession for the work, the amount of the contract being £800,000. The principal work consisted of a breakwater 625 meters long, the inner side of which was to form a quay 490 meters long and quays running southerly from this breakwater with an aggregate length of 960 meters. It was decided to adopt the monolithic system of construction, but there was not sufficient rise of tide to permit the use of floating depositors as at the Newhaven works, Sussex.

Work was begun in the spring of 1886. Small portable tipping boxes were used to deposit sack blocks of about 12 tons weight to build up a concrete retaining wall to be subsequently backed by filling. These sack blocks were persistently carried away. It frequently happened that immediately on deposition a sack block was swept into deep water and its contents scattered and a few minutes later the torn sacking thrown up behind the line of the wall. After many interruptions and much loss of concrete, stone was tipped along the edge of the wall as it progressed to form a foreshore slope or toe on the sea front. In 1887 the writer visited the works and found that the stone tipped in front of the foreshore wall had formed a slope of about 15 deg. and ran out into deep water, but it was obvious that the slope had not reached a position of quiescence.

In December Mr. Cary was appointed Chief Engineer of the corporation and immediately recommended an increase in the section of breakwater to 12 ft. above water level instead of two meters as originally designed, and to a finished width of 54 ft. to 35 ft. instead of 8 meters, and the capital of the company was increased to £1,000,000. According to the final plans the area of water directly sheltered is 60 acres, the total length of breakwater 2,060 ft. running into a depth of 46 ft., with three jetties alongside of an aggregate length of over 1,000 ft. The breakwater was built up of sack blocks of concrete capped with mass concrete, the lower tiers of sack block to about 8 ft. below water level having a weight of about 160 tons. The longest sacks were about 48 ft., which when deposited in the work stretched to about 54 ft. The next series of sacks were about 130 tons weight and 40 ft. long, stretching to about 46 ft.

To complete the work up to water level a tipping depositor, running on six lines of rails, was designed to carry a sack block of about 70 tons weight. From the sea bottom to the water level the breakwater thus consists of sack blocks, the top tier having been built by the tipping depositor and the lower tiers by floating depositors. The tipping depositor sack blocks were 32 ft. long (about 35 in the work) and these blocks were carried to about 3 ft. above the water level. The rest of the structure was built in mass concrete consisting of a capping 31 ft. wide, carried to 12 ft. above water level. Mr. Cary's paper in full will be found in *Engineering* of Sept. 8, and illustrations and descriptions of the tipping depositor in the same journal of Oct. 6.

Foreign Railroad Notes.

"The Belgian Company for Mexican Railroads" was recently organized in Brussels for the purpose of acquiring bonds and coupons of Mexican railroads, and especially of the Monterey & Mexican Gulf Railroad, to organize new companies for building and working railroads in Mexico, and generally to do any other railroad business in Mexico.

From Naples to Messina, in Sicily, the distance in an air line is 200 miles. To get there by rail a curiously circuitous route must be taken, 436 miles long, which requires 21 hours, besides the passage of the straits from Reggio to Messina—some hours more than the steamer passage. For several years, however, a new railroad has been under way along the west coast, and this will soon be completed, making a very direct route. A great ferry steamer will ply across the straits between Reggio and Messina, a little below Scylla and Charybdis, and the tourist will then be able to visit Sicily without getting seasick.

Nov. 1 "standard time" was introduced on the Italian railroads, being that of the 15th degree east of Greenwich, the same as in Germany and Austria, called in Europe "Central European Time." This meridian passes some 50 miles east of Naples, having but a small fraction of the kingdom east of it, and that comparatively thinly peopled. Heretofore all Italian railroads, except those in Sicily, have used the time of Rome, which is quite central. At the same time the hours of the day will be numbered from 1 to 24, beginning with midnight. Twenty-four o'clock will seem quite natural to the Italians, as until recently the hours were so counted universally, beginning, however, with sunset instead of midnight. In the greatest of Italian novels, an old priest, lamenting that better times have come too late for him to enjoy them long, says that it is truly a great thing for the young, but it is "half-past twenty-three o'clock" with him.

The reports of the German Railroad Union show that the railroads of Germany and adjacent countries are getting more service than formerly out of their locomotives.

tives. The average number of miles run per locomotive (including switching) has been as follows, in the years named:

	1887-88.	1889-90.	1891-92.
German railroads.....	19,832	21,906	23,252
Austro-Hungarian.....	18,602	19,659	21,527
Other Union railroads.....	19,269	20,375	22,131

The largest average service on any railroad reported is 27,894 miles on the Palatinate railroads. The average number of train miles per locomotive is given only for the German railroads, on which it was 13,280, 14,523 and 15,294 miles in the three years named, respectively, when the average gross load was 273, 236 and 275 tons, this including passenger as well as freight trains. In this country in 1890-91 the train mileage per locomotive was 23,467. The Germans have for some years studied our locomotive performance, and to some extent have introduced the practice of running with more than one crew.

Railroad Matters in Chicago.

Freight Traffic.—There was a decrease in the shipments of merchandise from the jobbing-houses, and perhaps the season has arrived for a moderate volume of business, as the interior retailers have filled up. This year, however, will be different from all preceding ones, at least for some weeks, owing to the closing of the Fair and the desire on the part of the exhibitors to ship their goods home. There are so many goods at the Fair that it will require several weeks to put them into shipping condition and get them away from the grounds. All the roads have sent their agents to the Fair grounds to solicit business, and also to facilitate the shipments; and the increase in this line will in a measure offset the decrease in the regular traffic. The traffic in grain and livestock was smaller despite the fact that the roads cleaned up the accumulated stuff along their lines that had been sidetracked to enable the rapid handling of the enormous passenger traffic during the last week of the Fair. The deliveries of flour for the week were the lightest for years. There was a decrease in the grain receipts from the preceding week, and also from the same time last year.

A comparison of the business of the leading Western roads centering in this city for the months of September and October shows some striking changes. There was a decrease in the receipts of flour of 57,020 barrels, and in grain of 530,000 bushels. The principal changes were an increase in the flour movement by the Northwestern, the Chicago, Burlington & Quincy, the St. Paul and the Wabash. The Great Western, that generally has a large flour business, decreased, and so did the Rock Island and the Illinois Central. In the grain movement during the month of October the only road showing an increase was the Atchison, the others losing moderately. When a comparison with the month of October last year is made, there was a decrease in the flour movement of 146,615 barrels, the most striking loss being made by the Burlington, 56,349 barrels; the Great Western had the next heaviest loss, 45,281 barrels; and the third on the list was the Northwestern, 36,451 barrels. The St. Paul held its own fairly, only losing 12,850 barrels, and the Rock Island 10,925 barrels. There was a notable reduction in the grain movement between this year and last, the decrease for October being 7,549,000 bushels, while the reduction in flour was only equal to 659,767 bushels of grain. As in flour, the Burlington was the principal loser, 4,627,000 bushels, or over one-half of the total loss by all the roads. The statement has come here from New York that the Burlington only handled 600,000 bushels of grain last month. This was evidently sent out by the Wall street bears, as the deliveries by that system here were 6,082,000 bushels.

The following shows the deliveries of flour and grain at Chicago by the roads mentioned during the month of October and for the same time last year:

	1893.		1892.	
	Flour.	Grain.	Flour.	Grain.
N. W.....	Bbls.	Bush.	Bbls.	Bush.
Ill. Cent.....	62,141	5,470,000	58,592	5,731,000
C. & N. W.....	14,250	3,827,000	1,025	3,679,000
C. & R. I. & P.....	41,450	3,353,000	30,525	4,354,000
C. & B. & Q.....	51,280	6,062,000	110,629	10,689,000
C. & Alton.....	11,850	1,440,000	28,535	1,949,000
C. & E. Ill.....	1,350	581,000		1,036,000
C. & M. & St. P.....	74,075	3,274,000	86,625	3,437,000
Wabash.....	4,650	1,153,000	12,320	1,226,000
C. & Gr. W.....	66,175	842,000	111,456	1,896,000
A. T. & S. F.....	4,821	1,734,000	1,825	1,268,000
L. N. A. & C.....		63,500	125	88,000
Totals.....	335,042	27,804,000	481,657	35,353,000

The following table shows the deliveries of flour and grain by the leading Western roads centering in Chicago, for the week ending Nov. 4, with comparison for the same time last year:

By—	1893.		1892.	
	Flour.	Grain.	Flour.	Grain.
N. West.....	Bbls.	Bush.	Bbls.	Bush.
Ill. Cent.....	15,750	983,000	18,926	828,000
C. & N. W.....	5,500	669,000	1,500	569,000
C. & R. I. & P.....	9,900	622,000	7,050	624,000
C. & B. & Q.....	9,900	1,170,000	19,914	1,997,000
C. & Alton.....	3,750	233,000	5,725	362,000
C. & E. Ill.....		95,000		117,000
C. & M. & St. P.....	11,525	678,000	15,550	800,000
Wabash.....	900	202,000	2,020	194,000
C. & Gr. W.....	10,331	179,000	17,465	366,000
A. T. & S. F.....	400	330,000	300	249,000
L. N. A. & C.....		8,000		25,000
Totals.....	71,006	5,069,000	91,450	6,211,000

There is a prospect of the Interstate Commission having a meeting in Chicago in the near future, to hear the evidence in the complaints filed by Commissioner Iglehart, of the Chicago Freight Bureau, against the roads east and south alleging that they discriminate against this city in rates. The Chicago bureau asks for an equalization of rates on a mileage basis. The point is made that the distance from New York to Knoxville, Tenn., is 735 miles, and the rate \$1.08, while the distance from Chicago is but 560 miles, and the rate \$1.16. The rates to all other points are in proportion.

Passenger Traffic has grown less each day since the close of the Fair, and the reduced rates have expired except in a few instances. The Western roads are having the best business, as many people from the East have taken trips farther westward to see the country. Some have gone to the Pacific Slope, so that the travel in that direction is good for the season. The Illinois Central is the only road that has been able to make a good estimate of its business during the World's Fair, and it claims to have handled 11,000,000 passengers. The boats that were to compete with the railroads for the Fair traffic handled a large number of passengers, but failed to make any money.

CHICAGO, Nov. 6, 1893.

TECHNICAL.

Pantasote.

The inventor of pantasote is Mr. R. P. Bradley, a chemist, and he and the Pantasote Leather Company keep the ingredients and quantities a secret. That it contains rubber or any animal substances the company denies. It is not combustible, nor does it soften and become sticky as those substances would under such treatment. It does not become stiff and brittle with age or in the cold as do rubber, resin and wax. The fact that it is waterproof, quite odorless even when burnt, and does not get sticky when heated, would lead one to believe that it is in part a mineral substance. It may contain shellac or some of the acid phenol compounds in combination with asbestos or cellulose. Whatever its composition, it has proved a durable substance, and the process of its manufacture is well protected by patents, trademark and the experience of the company in its application.

Pantasote leather is not simply a piece of cloth painted over with a coat of rubber or paintlike mixture; it is made by sheeting two or more pieces of cloth or canvas together with the warp running in different directions to give it great strength. The one (or several thicknesses) making the leather side is passed between heavy rollers many times, and each time it receives a very thin coat of pantasote. The cloth or canvas is repeatedly passed through the rolls until it is literally saturated with the mixture; after which it is backed by another thickness of cloth for greater strength and firmness. This process is patented. The pantasote mixture itself is of the color intended for the leather. There is no superficial coloring; so that the goods do not fade or show surface wear. A scratch or cut gives no different color or shade.

Its cost to the company cannot be estimated, but it is offered to customers at about one-half the cost of leather of supposed equal durability and service. One railroad company estimates the cost of its upholstering in leather at 20 cents per square foot, while pantasote of similar appearance, durability and wear may be had at 8½ cents per foot. That the pantasote leather shall be as durable, the company guarantees. To the ordinary passenger it has the appearance and quality of leather, and it requires some other test than that of the five unaided senses to distinguish it from leather when it is in a piece of furniture. It is made in a great variety of weights, patterns and colors. For car shades it seems peculiarly adapted, for it possesses the following superior qualities, viz.: However warm the day or sun, it will not stick to the glass; it will not stain nor fade; dampness will not injure it; it will not hold the dust. Pantasote leather has been on the market but 18 months, and it is in use by 15 railroad companies, including the New York Central, the Pennsylvania, the Canadian Pacific and the Pullman Palace Car Company. It has been approved by the U. S. Navy Department for use in upholstering and decorating the U. S. steamships "Olympia," "Columbia" and "Monterey," and the British Admiralty has recently given an order for a quantity for its service. The company was awarded the medal and diploma for its exhibit in this department at the Columbian Exposition.

Steamship Records.

Both the eastward and westward records across the Atlantic have been again broken by the Cunard steamships Campania and Lucania, and the glory remains divided between them. Records are made by one ship only to be smashed by the other on the next passage. The Campania now holds the eastward, having on Nov. 3 completed the passage in 5 days, 12 hrs. 7 min., 1 hr. 23 min. better than the Lucania's record of Oct. 20. The daily runs were 47, 491, 400, 505, 495 and 293 knots, a total of 2,812 knots. This makes the passage across the Atlantic but 7 minutes more than 5½ days. The even maintenance of speed as shown by her daily runs is remarkable, being a difference of only 15 knots between the greatest and smallest full day's run. The Lucania retrieved, in a measure, her loss of the eastward record

by establishing a new westward record by her arrival in the evening of Nov. 3 in 36 minutes less time than the Campania's record of Oct. 20. She made the passage in 5 days 12 hrs. 47 min., and her daily runs were 481, 542, 536, 490, 535, 196 knots, making a total of 2,780 knots. The average speed of the Campania was 21.294 knots, the best average speed ever made. The Lucania's average speed was 20.936, not so good an average as on her last trip eastward. (See Railroad Gazette, Oct. 27, 1893, p. 785.)

The Challenge to American Locomotive Builders.

In the last issue of the Railroad Gazette there appeared a letter sent by the exhibitors of the locomotive "James Toleman" to American locomotive builders challenging them to test one of their locomotives against the "James Toleman." The challenge was sent to four locomotive building companies and to one railroad. Of the builders, three replied that the locomotives exhibited by them were built on orders from railroad companies and were to be delivered to the latter as soon as the Exposition was over. The Baldwin company replied that as the performance of their engines were well known to themselves and to American engineers, and that of the "James Toleman," or its class, was not, it would probably be best for the "James Toleman" to show what it is capable of doing in the service in which the Baldwin engines have made their records; that if the engine could be sent to Philadelphia it could easily be arranged to have it work the "Royal Blue Line" trains between Washington and Jersey City and its performance could then be compared with the records of the Baldwin engines. It is quite probable that the locomotive will be sent to Philadelphia and, if satisfactory arrangements can be made, it will work the trains mentioned. The New York Central officers acknowledged receipt of the challenging letter, but desired time to consider the matter. At the time of the present writing Westwood & Winby have had no definite reply from this company, and the question of a trial is still undecided.

Cave-in on a Colliery Branch of the Pennsylvania.

On Oct. 30 a cave-in occurred on the line of the Girardville Branch of the Pennsylvania in the outskirts of the borough of Shenandoah, Penn., near the Cambridge Colliery. At this point a half-through Howe truss bridge of a span of about 60 ft., supported upon timber trestles, had been constructed across a street and a spur track of the Philadelphia and Reading. After a heavy train on the Girardville Branch had passed this point going in the direction of Frackville, the surface of the ground upon which the trestle abutments of this bridge were supported suddenly gave way, and the whole structure sank about 7 ft. The railroad people at once went to work and repaired the damage, and traffic was resumed.

Cave-ins of this character are of frequent occurrence in the vicinity of Shenandoah. Sometimes whole blocks of buildings are racked and shaken by the subsidence of the earth's surface, as at this point the Mammoth coal vein is extensively worked. As it averages from 40 to 60 ft. in thickness, whenever the miners begin to rob the pillars a cave-in is unavoidable. The Shenandoah Branch from Frackville has had to be shifted several times in various places, as the ground underneath the roadbed has been undermined. About six months ago there was a slight cave-in on the Girardville Branch, which was caused by the falling of the surface of the ground from the mine workings, near the outcrop. This cave-in was situated about one quarter of a mile from Shenandoah, and the roadbed of the Girardville Branch had to be shifted to more solid ground.

Car Heating Patents in England.

The directors of the Consolidated Car-Heating Co., of Albany, N. Y., on Oct. 31 signed the final papers transferring to an English syndicate the English steam and hot water heating patents of the company. The English electric heating patents have not yet been taken by the syndicate, although it has an option thereon until Jan. 1, 1894. The option on the heating patents which it bought would have expired Nov. 1.

Serve Boiler Tubes in French Locomotives.

The fact, already noted in these columns, that some of the four-cylinder compound locomotives on the Paris, Lyons & Mediterranean Railroad, in France, have recently been fitted with ribbed boiler tubes of the Serve pattern with the view of securing greater steaming capacity and reduced weight, makes the following additional information interesting. Some of it we have already published. M. du Bousquet, Chief Engineer of the Northern Railroad of France, in 1892 equipped three engines with them, and during the present year has fitted up seven express locomotives, while 15 compound locomotives, now being built for his road, will also have them. The experience with those engines on which the tubes have been used has been uniformly favorable. The amount of heating surface is increased, even though the number of tubes is smaller than before, and the engines have proved to be quick steamers and economical coal burners. A series of trials with some of these engines have been made the subject of a paper recently presented to the French Society of Civil Engineers by M. Kéromnès. The first practical application of Serve tubes in France was about seven years ago on some boats plying on the river Rhone and belonging to the Bonnardel Navigation Company.



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EDITORIAL ANNOUNCEMENTS

Contributions.—Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies in their management, particulars as to the business of the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and railroads, and suggestions as to its improvement. Discussions of subjects pertaining to ALL DEPARTMENTS of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.

Advertisements.—We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay, EXCEPT IN THE ADVERTISING COLUMNS. We give in our editorial columns OUR OWN opinions, and those only, and in our news columns present only such matter as we consider interesting, and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.

Probably every serious minded railroad has its own apparatus for testing steam gauges, and the larger companies have a number of such equipments at different places along their lines. There is generally a man at each repair shop, where gauges are tested, whose duty it is to test all gauges sent in and make them read correctly. As this man is generally in the employ of the company for years, and devotes much of his time to gauge testing, it may be assumed that the work is well done. It has been pointed out that the same man ought also to attach each gauge to the boiler on which it belongs, and that he should be instructed how to connect them properly. It is quite generally the custom to allow anyone in the shop to screw on the gauge, and the usual method is to fasten the gauge in place and to open immediately the plug giving connection between the gauge and boiler. Generally then, instead of comparatively cold water entering the gauge, it is filled first with steam or hot water, for which the delicate spring of the gauge is not designed. As a result the gauge will read five or ten pounds too high or too low when those who depend on its readings think it is correct. The proper method to be used in attaching gauges to boilers is to make sure that the siphon, or U-tube, is full of cold water before screwing on the gauge, then when the pressure is admitted cold water fills the spring tube of the gauge and the gauge registers as shown by the testing apparatus. As it is much easier to impress upon one man the necessity for attaching the gauges in the right manner than to instruct all the men in the machine shop, and as the gauge tester generally understands how delicate the gauges are, it seems that he is the man who should attach them to the boilers. Several times we have seen gauges tested and applied to boilers and immediately removed and tested again and found to vary from five to ten pounds from the first test reading. It was invariably found, in such instances, that hot water or steam had been admitted to the spring tube, due to the fact that the pipe had not been filled with cold water before attaching the gauge.

In our issue of Sept. 15, 1893, we considered the practical value of track brakes for high speed trains, but nothing was said specially about the usefulness of such brakes for slow speeds on steep grades. The possible use of track brakes on mountain railroads is brought up by an inquiry from a Western railroad regarding the utility of such brakes as an additional safeguard on steep grades. At any speed the limit of the retarding force that can be applied to wheels of cars depends upon the adhesion of the wheels to the rails. The adhesion of the wheels to the rails decreases as the weight on the wheels is decreased. A track brake can only be made useful by reducing the weight on the wheels and applying it to the track brakeshoes. As large a percentage of the light weight of the car as can be practically utilized, without danger of sliding the wheels, is already applied by the brakes to the wheels, and it is therefore

evident that the track brake cannot be used as an adjunct to the wheel brake when the car is empty. Therefore, where a track brake is used to reinforce a wheel brake, its usefulness must be limited to loaded cars. It is equally important in this case that the track brake shall always permit the full light weight of the car to rest upon the wheels, or the wheel brake will cause them to slide. As the load in the car will vary greatly at different times, and as the track brake must simply carry the load, it is first of all absolutely essential that the track brake shall be applied with a force proportional to the load. If, instead of being an adjunct to the wheel brake, the track brake replace the wheel brake altogether, it is evident that, to prevent derailment, a certain percentage of the entire weight of the car and load must be permitted to rest upon the wheels. It is apparent, therefore, that in this case also, if the track brake is to be more efficient than the ordinary wheel brake, it must brake in proportion to the load. The practical question at once arises, "By what means shall a track brake be operated and how shall it be made to brake in proportion to the load?" Or, "Is it more simple to brake in proportion to the load with a track brake than with a wheel brake?" The relations between the track brake and the wheel brake may be stated in a few words: Either form of brake can employ only a portion of the entire weight of the car and its load; but it is highly improbable that so large a percentage of the entire weight, as may be used with a wheel brake, could with safety be lifted off from the wheels, and the efficiency of the track brake must always be thus below that of the wheel brake. A track brake cannot be used in conjunction with a wheel brake, unless its power shall vary in proportion to the load in the car, and, if it is practicable with a track brake. It is just as practicable and much more simple to cause the power of the wheel brake to vary with the loaded weight. In short, under any conditions where the track brake might be used, either alone or in combination with the wheel brake, a higher efficiency and better control of the train can be obtained with the use of the wheel brake alone.

Radical Treatment of the Cash-Fare Evil.

Readers of the *Railroad Gazette* will remember an item published a few weeks ago, stating that the Chicago & Alton had introduced on its lines in Missouri a plan of making passengers show their tickets before entering the cars, even at small stations. This is an important experiment. The losses suffered by the railroads of the United States—and practically all of them are included—from carrying passengers for nothing, especially in trains making frequent stops, constitute an aggregate which, if known, would be astonishing. Every manager knows that this is a serious leak, but he knows, too, the difficulty in stopping it, and so he does what he can to promote honesty among his conductors and to get rid of the thieves, and there the matter rests. But this great leak goes on where the conductors are both honest and faithful. On a heavy local train passengers get off every day, probably many of them, without surrendering their tickets and without paying cash, simply because the conductor cannot find them. Our title, properly amplified, would read: "The Cash-Fare Evil and the No-Fare Evil." It is not alone dishonest conductors, but dishonest passengers that the railroad manager must keep a watch upon.

We have therefore asked for further information concerning the action taken by the Alton, and General Manager Chappell gives us the following particulars:

The trains to which this gate system is applied are the local mail trains between St. Louis and Kansas City, a run of 320 miles. The well known Wood safety gate is used. Before inaugurating the system the conductors on these trains each collected from 80 to 100 local fares a day. Many of the passengers in Missouri are colored people, who persistently neglected to buy tickets; in fact the whole population of Missouri were averse to purchasing tickets at the ticket office, although we used every inducement to have them do so. But since the gate system was inaugurated the payment of fares on the trains has been reduced, so that there is practically none except from passengers getting on where there are no tickets on sale.

These trains have three passenger cars each, all of them provided with the gates. The front of the forward car and the rear end of the rear car are kept locked. We employ two gatemen, who are under the control of a special agent, and are in no way connected with the conductors, stationmen, or other employees. One man is stationed between the first two cars, and the other between the second and third cars, and to one of these every passenger must show his ticket. The tickets are not punched by the gatemen.

We anticipated more or less delay to trains, as instructions were given that where passengers applied for entrance to the train without a ticket they should be sent back to the ticket office to purchase tickets, and that the train should wait for them to do so. The system was put in operation on the first day of June, and from that day until the present time, quite to our surprise, there has been no delay whatever that has come to my knowledge. In a very few cases people have applied for admission to the trains without tickets and have been sent back for tickets, but this has resulted in no delay to the trains.

As a result of this gate system, for the month of June at six of our larger stations in Missouri, the increase in ticket sales was \$1,200, notwithstanding the fact that local business generally was much less than a year ago. We employ five gatemen at \$60 a month to handle the two trains between St. Louis and Kansas City.

We are also using this same system without special men, the brakemen and porters attending to the duties, on our vestibuled trains between Roodhouse and Kansas City, and we expect to soon put it in operation on our day local trains between Chicago and St. Louis, and also on our local trains 5 and 6, between Chicago and Roodhouse.

The Wood safety gate for car platforms, which was described in the *Railroad Gazette* of March 18, 1893, is what its name implies, a safety device; it is not locked but merely latched, and the locking of the car doors is the essential thing in compelling all the passengers to pass before the examiner. The closed gate serves as a warning to passengers not to attempt to enter at the wrong place. The Missouri Railroad Commissioners' order, not to use this plan of preventing the free citizens of Missouri from going where they please, and when they please, which was issued probably to gratify some slightly irritated individual, has been suspended, and it is not likely that the Commissioners will insist on thwarting such a reasonable regulation.

And the reasonableness of this regulation is so obvious, where it can be carried out, as it is stated to be on the Alton, without delaying trains, that it would be idle to argue the question for a moment, if it were not that our happy-go-lucky American fashion of collecting tickets and fares has been put up with so long that we have come almost to think any other method impossible. We all know that the English roads have used a good system ever since they started, but no one seems to have had the necessary grit to introduce a plan which would inconvenience the public a little, and the necessary realization of the losses by the guess-work system to stimulate his grit; and so matters have rested.

There have been slight exceptions to the rule; collectors have been employed here and there, making the detection of cheating passengers a little more certain, and on one line, the White Water division of the "Big Four," the plan of the Alton, in its essential feature; was tried several years ago, and we believe is still in use. The limiting of local tickets to one day has also been an important improvement by preventing the use of an uncollected ticket for a second journey. This limit is now in vogue on the Alton and a large number of other roads. The Southern Pacific has just put gates, which are high, and are locked so as to make a complete barrier, on the cars of its local trains in Oakland, though this may perhaps be regarded as somewhat different traffic from the ordinary way train; it is more like that of the city elevated roads, where the purchase and surrender of tickets has always been made a sure thing.

Although the Alton people are much pleased with their experience there will be those who will be specially interested in the results of the experiment after it has been longer tried. The system does not insure that all tickets will be collected, but only that every passenger shall buy one. The brief life of the ticket greatly reduces the chance of a second use of the same ticket, but the true desideratum, of course, is that all tickets shall be collected and canceled. Those who condemn the collector system on the ground that the collector will sooner or later be found as dishonest as the average conductor, will expect to find the gatemen in collusion with the conductors after a while, especially where the gateman stays with the train instead of staying at the station. There are various ways of guarding against this, however, and we shall look for permanent results on the Alton which will justify us in counting this an important improvement in conducting passenger traffic. Along with the one-day limit, the duplex cash-fare ticket and other safeguards which can be adopted whenever a road sets out to conduct this branch of the business in a systematic manner, the present scheme may be the means of banishing a standing disgrace of the operating department. The view is common that this disgrace is unavoidable, that the American system of dealing with passengers makes us the helpless victims of thieves; but it is more nearly right to say that with this system those responsible for it are propagators of thievery.

Cost of Locomotive Repairs.

A committee has been appointed by the Master Mechanics' Association with instructions to report upon the comparative cost of locomotive repairs on different railroads with different classes of engines, and also upon the comparative cost of repairs to engines built by railroad companies and by locomotive builders. At first this may not seem a

very important matter, but it is one that is important to some railroad men and about which they are continually worried. It is common practice among the higher officers of railroads to call in the Master Mechanics and the Superintendents of Motive Power for an annual or semi-annual lecture on the cost of repairs. The mechanical man is generally confronted at the conferences by a statistician's report of one or more competing lines whose repairs per mile run or per ton mile are less.

Quite frequently the higher officers fail to inform themselves about two important matters before they take up such a conference. They do not know the real differences between the conditions of operation, on the roads compared, in such features as affect the equipment, and they do not know how the accounts are kept on the different roads. The busy, over-driven Superintendent of Motive Power has little time to devote to methods of bookkeeping, and yet he is disarmed in these conferences if he does not know just how the repair accounts are kept on his own road and on others. One railroad in the West has been used as a whip for more railroad mechanics than any other, and probably that road is about as thoroughly hated for its disagreeable comparative economy as any road can well be. Not long since desperation forced a competitor to make an examination of the method used by this road in accounting for repairs, and the interesting result was found that when the same expenses and expenditures, including the cost of new equipment to fill blank numbers and the cost of wrecks, was included, the repairs per mile run were in excess of the other roads with which it was compared.

If the committee appointed by the Master Mechanics' Association can point out, by example, the small value of comparisons of statistics of different lines where the accounts are kept in different ways, or until such accounts are equated and put upon the same basis, their work will be a boon to Master Mechanics. It is rough on a railroad officer to continually refuse to fill requisitions for tools and better facilities for making repairs, and to charge his repair department with the cost of wrecks, and then compel that officer to defend himself against charges of unnecessary expenditure based on the statistics of competing lines about whose accounts and methods he knows nothing. The injustice of all this is apparent, and those who are subjected to investigations of this sort will look to the committee for a clear way out of the difficulties.

We do not say that the railroad officers who start such investigations do so with the intention of being unjust; quite to the contrary, they are actuated only by the best motives and are looking continually for the best interests of the road. The injustice is only accidental and arises solely from the fact that they do not appreciate the difference in the results of different methods of keeping accounts of repair work. It has been said that figures never lie, but it must be granted that statistics and averages can give points to the most expert imitator of Ananias, and the only safe way to get the truth from statements of repair costs per train mile is to examine fully into the methods and existing conditions of the roads from which the returns are taken.

Not infrequently locomotive repairs increase rapidly for a period of several years and sometimes the master mechanic is severely censured and is accused of neglecting his duty when the whole reason for the increase is entirely outside of matters under his control. Take, for instance, a case where the trains have been comparatively light and the locomotives correspondingly small. Let the locomotive equipment be changed so that the engines are much heavier and haul larger trains. If now the repair account statistics be based on the miles run and the cost be given in cents per locomotive mile, the cost of repairs will of course be higher. It will cost more to keep a heavy engine in repair than a light one, other things being equal, for each part weighs more, is more difficult to handle, sometimes requiring two men when one was formerly enough, and the surface to be finished on a machine, or to be covered with paint or examined for defects, is greater. But to be just to the repair department the locomotive repairs should be based on the tons hauled and the distance traveled, that is, upon the ton-miles of total train. When this is done it will be found that the cost of locomotive repairs for each unit of useful work is less with large engines than with small ones and the repair account will show a reduction, not an increase.

The Master Mechanic is, however, no more to be praised for this reduction than he is to be blamed for the apparent increase when the repairs are based on locomotive miles. The results are entirely beyond his control in so much as they are affected by the increase in weight of the locomotive equipment. The only

just way to determine whether a Master Mechanic is doing his duty is to keep an account of the repairs to individual engines, and, when making investigations, to examine closely into the nature of the repairs, excluding from the results upon which the conclusion is based, all matters pertaining to expenditures for repairs over which the Master Mechanic has little control.

Talks with railroad men have brought out the interesting fact that there is a wide difference in opinion among Master Mechanics about the relative wearing qualities of locomotives built by the railroads and by contract locomotive shops. Some state positively that the engines built by themselves wear longer and give better service than those purchased from builders, and to the contrary others, having great experience with home-built and contract-built engines, assert positively that there is little or no difference between the two, especially where the locomotives built by contract have been well supervised by the railroad company's inspector. Of course all know of special cases where contract-built locomotives have proved to be very inferior, but we also know that bad workmanship and bad material have been put into engines built in railroad shops. Probably in the last few years the workmanship of contract shops has been improved, at least this is apparent from the experience of a good many purchasers, and it may be that the committee will say something next year about contract-built engines that will be agreeable to locomotive builders.

It will be seen from what precedes that the committee will be pretty full of business if it manages to make anything like a complete report on this subject during the coming year, and it is also evident that the work to be done is definite and important and the committee should receive the earnest assistance of every Superintendent of Motive Power who is called upon for opinions and information. No one can tell where the inquiry and investigation, backed up with objectionable statistics, will strike next, and the sooner the basis of comparison is made fair and just the better for all concerned.

Railroad Finances.

Many folks are watching Wall street very closely now for signs of the financial relief which may come to the railroads. The panic, by decreasing railroad earnings, forced the railroads to resort to many expedients to tide over the period of depression, and floating debts, which in ordinary times would not give any trouble, were secured by temporary loans. This condition is one of the most troublesome to the railroads at the moment. A floating debt in an off railroad year is about as dangerous an element in railroad economies as a double standard is in national finance. It forced the Northern Pacific, Union Pacific, Reading, "Clover Leaf" and others into the hands of receivers. A number of other systems approached the brink, and would undoubtedly have gone over but for strong and skillful financial backing.

Nearly all of the systems have assets which in ordinary times would be sufficient to discharge their obligations, but during the panic they could not have been parted with except at a great sacrifice and it was good management to get temporary help. Many of these assets are in the form of bonds issued against improvements and betterments, and intrinsically valuable. As soon as they can be disposed of to advantage the railroads will be relieved of a great burden; and this brings us to the bond market. During the decline of the last week in the stock market—which averaged some three points in active railroad stocks—the bond market was very stubborn and in some securities actually scored advances. This indicates that the bond market is not now like the stock market, susceptible to speculative influences.

Money is very easy in New York, 90 day funds being offered at $\frac{3}{4}$ per cent. on mixed collateral. The margin required is about 20 per cent. This condition is growing more pronounced, owing to the limited supply of commercial paper. Thus, on Saturday last, the Associated banks held \$52,013,450 in cash over and above the lawful cash reserve of 25 per cent., being an increase for the week of \$3,225,975. This shows that there is a vast sum of money which must soon seek employment. Unless there is more disposition to use it in trade, it is likely to go into "gilt-edged" four and five per cent. bonds. This will have the ultimate effect of taking from "the street" large blocks of these securities, and as industrial conditions improve room will be found for new issues, and an opportunity will come for various railroads to make contemplated issues. In this way the floating debt trouble will be removed and the straitened condition eased. Just at present London is not very enthusiastic over new issues, and the same can be said of the American public.

As a sign of returning confidence we note that the Baltimore & Ohio has just secured a sterling loan of \$3,000,000 to meet its current necessities. The New York Central is said to have got a sterling loan, and the St. Paul is reported to have got considerable accommodation lately. Other roads have recently raised important sums. The effect of this accommodation is already felt somewhat.

A notable departure in railroad financing was the purchase last week of the Chesapeake & Ohio Southwestern, jointly by the Illinois Central and the Louisville & Nashville. It is paid for with a negotiable security, secured by proxies consisting of ten year notes said to be in the neighborhood of \$6,000,000. This eliminated competition for the line, gives each company its use, and obviates the necessity of an investment by either company of additional capital and building new lines in the territory which it serves.

Last week listings on the New York Stock Exchange indicated the tendency on the part of railroads to put out new issues. Thus, Wheeling & Lake Erie issued \$1,000,000 of common stock; New York, Lake Erie & Western, \$3,000,000 of consolidated 6-per cent. bonds of the Long Dock Company; Missouri, Kansas & Eastern, a part of the M., K. & T. system, \$4,000,000 first mortgage fives; Chicago, Rock Island & Pacific, \$175,000 of extension and collateral fives; Wabash, \$1,000,000 first mortgage bonds, to retire maturing obligations; Duluth & Iron Range \$549,000 first mortgage fives. These various issues met with a good reception by investors.

Noisy Locomotives.

In some Eastern towns, where people have time to think about personal comfort, there are ordinances regulating the ringing of bells, the blowing of whistles, and the popping of safety valves within town limits. The result of such regulation has been to reduce those noises a good deal; in fact, it is a rare occurrence in some towns that one hears a disagreeable sound from locomotives except the rattling of the train and the noise of the exhaust. This shows the possibility of reducing the noises made by locomotives materially. One step forward has been taken by elevated railroads in cities by using a muffler on the exhaust pipe. Such mufflers reduce so materially the noise of the exhaust that when used in connection with the other precautions mentioned the noise made by locomotives is reduced to that of the rumbling of the engine as it passes over the track. It is possible, then, to materially reduce all the disagreeable sounds made by locomotives. Engines so equipped and worked represent one extreme; the other extreme is represented by small locomotives hauling heavy trains with the bell, whistle, safety valves and exhausts all free to produce as much noise as they can.

The one extreme of quietness is found on the Manhattan elevated road in New York and the South Side elevated in Chicago. The other extreme of noise is now found in the vicinity of the Illinois Central Railroad in Chicago. By actual observation, at a point on the lines between the city terminal and the World's Fair, one day this month, about seven o'clock in the evening, when the inhabitants of that portion of the city were at dinner, the trains passed at intervals of a minute and a half, and the noise made conversation difficult at a point fully a block from the railroad. This road passes alongside of a thickly settled portion of the city. The engines are not provided with mufflers of any kind, and are handled about as carelessly as they could be so far as the production of disagreeable sounds is concerned. The safety valves pop frequently, the bells ring, and the whistles blow about as the engineers see fit. The exhaust, when starting from a station, is tremendous, and the windows rattle in their frames whenever the start is made from a local station, and in the evening a pyrotechnic display of sparks issuing from the top of the stacks accompanies the acceleration of the train.

All this goes on in Chicago, under the noses of the most influential citizens, and apparently they are too busy to notice it, or their complaints have been silenced by the claim that the noises which agitate the smoky atmosphere are absolutely essential to first-class locomotive operation. Perhaps they have even been led to believe that the more noise the locomotive makes the smarter it is, and these words are written for the information of those who are suffering in the belief that there is no recourse. Some Eastern visitors to the World's Fair know better.

Mufflers for safety valves cost but little, the use of the bell and whistle can be regulated, and the sound of the exhaust at starting can be reduced in several ways: By using a proper arrangement of exhaust apparatus that will permit the use of a larger nozzle; or by using a muffler; or by using compound locomotives without mufflers. The last is more economical than the second, as the power of the steam is used to propel the train and not to push itself out of the stack. An example of the reduction of the sound of the blast by use of the compound engine is found on the elevated railroad in Chicago where there are no mufflers, and no more noise than is made by the single expansion engines with mufflers. So, while noisy locomotives are not a necessity, to lessen the noise is no hardship to a railroad company, and may be conducive to better economy. The loss of steam, which goes to make the noises about locomotives, is great; it is not an economical fireman who permits his engine to blow off frequently at the safety valve, and it is not an economical exhaust apparatus that permits much noise to be made by the exhaust. Perhaps, then, if some of the Chicago railroads (the Illinois Central is not the only offender) had more consideration for the residents along their lines in the matter of noise, a considerable financial benefit would follow the saving of fuel.

Suburban Express Service on the Illinois Central.

With the close of the World's Fair on Oct. 31 the Illinois Central discontinued its express trains that were run between Van Buren street and Jackson Park, but the residents about Sixtieth and Sixty-third streets patronized the World's Fair trains to such an extent in going to and from their business daily that the company feels justified in maintaining an express service between Van Buren and Sixty-third streets. The trains will stop at Sixtieth street, the only stop between the former two stations. The cars that were built especially for the express-train traffic between the city and the Fair grounds have been withdrawn, and will be converted into fruit cars for the New Orleans-Chicago service, as was intended; the cars were so constructed that such change could be easily made. They are now being changed, except 40, which will be kept for summer excursion business.

The company's standard suburban cars and coaches in which suitable changes have been made replace the special cars. The steps of the passenger cars have been removed and car platforms extended out the full width of the car, as the station platforms at the three stations are as high as the car floors.

Four of these express trains have been put on and they will run at intervals of 15 minutes either way. The Sixtieth and Sixty-third street stations are convenient to Jackson Park and as there will be much work at the park for several months yet the trains will undoubtedly prove profitable to the railroad and very convenient to those having business at the park. There is another side to the arrangement, too. The South Side elevated road crosses the Illinois Central at Sixty-third street and has two stations conveniently near the line of the latter at that point; Sixty-third street then is a competitive point. The elevated trains make the run between this common point and Congress street in practically the same time made by the Illinois Central to Van Buren street, so the latter company could not hope to maintain its regular suburban rates from the point named against the five-cent fare of the former, and the only way to maintain a rate any greater, and get traffic from Sixty-third street, was to put on the fast trains. The fare each way on these will be 10 cents, quite a reduction from the suburban rates that prevailed before the elevated became a factor in the case.

It can be a question of only a few months when the Illinois Central will find it necessary to extend its suburban express service to South Chicago and Pullman or Kensington, in order to get its share of the traffic from the suburbs between Sixty-third street and those extreme points. The northern terminus of the Calumet Electric Street Railway is at Stony Island avenue and Sixty-fourth street; its 54 miles of track cover very completely the country south of that, and the fare over any part of its lines is five cents. The elevated road has a station at Stony Island avenue and Sixty-third street, so that by a change of cars and a walk of one block people living conveniently near the former can reach the city for 10 cents. The fare from the extreme points by the Illinois Central is about double that, if 10 ride tickets are purchased. The difference in time by the two routes is about 30 minutes, which, so far as the business men is concerned, is sufficient to counteract the difference in fare. However, the 15 or 20 cents to be saved on a round trip by the new route will catch a very large number of those who do their traveling between the morning and evening hours.

In a recent issue we mentioned the fact that the electric roads were injuring the suburban business of the steam surface roads, and this is only another instance to show that the latter must be thoroughly alive. The competition above referred to is not imaginary; it is real and has been for several months, and if the fact of its existence has been hidden till now it is only because it has been covered up by the immense traffic incident to the World's Fair.

The "ticket-receiver system," the plan of having officers of the auditing department located at all division termini to receive and examine conductors' collections with the utmost promptness, will be remembered by many of our readers from a description of it by Mr. M. Riebenack, of the Pennsylvania road, printed in the *Railroad Gazette* of March 18, 1892. Mr. Riebenack has recently read a paper before the International Statistical Institute at Chicago, in which he reiterates the statement that only a large business will justify the maintenance of this system. He says: "Two conditions seem necessary to obtain satisfactory results for the expense involved: First, the railroad's passenger business must be of sufficient volume for the estimate of its train earnings to become a factor in the adding or withdrawal of passenger trains. Second, that the information is also used for estimating current earnings weekly or oftener in advance of final audit of earnings from passengers."

It is obvious that exact estimates for use in putting on or taking off trains are not needed every week, or even every month; and if the premise is sound the conclusion must be correct. Mr. Riebenack's view seems to be borne out by the action of the Chicago & Alton, which has withdrawn the receivers who were placed at division termini in January, 1892, when its new system of limited local tickets was put in operation. The same amount of work is done, however, but it is all done in the auditor's office. This makes it possible to check up conductors' collections with a pretty good

degree of promptness. Mr. Riebenack does not bother himself about whether the receiver system checks dishonesty among conductors, though that is, as we understand it, a chief element in its value. On the Alton, however, the one-day limit on the tickets, and other safeguards, serve this purpose pretty well. Mr. Riebenack describes some of the details of the work on his road as follows:

"Through the operation of this system the accounting department is enabled to promptly lay before the transportation officers and others interested monthly statements showing the number of passengers carried and the total earnings and average earnings per trip and per mile run for each and every train on which passenger business was moved. The method followed in the general office in the preparation of train-earning data is to transfer to specially prepared sheets the daily business of the several trains as exhibited by the statements from the respective ticket receivers, and at the end of the month totals are made for each train of the passengers, ticket mileage and cash collections. To the ticket mileage is then applied the average rate per mile which the actual business for the preceding month shows to have been received from passenger traffic. To the data thus obtained is added the number of passengers and amount of earnings from such of the card commutation ticket travel as is not shown on the reports rendered by conductors running on lines in certain populous districts, by reason of the impossibility of obtaining the necessary record on such trains, and which is consequently not included in the ticket receivers' statements. This commutation travel is apportioned to the several trains on the basis of percentage, arrived at by special records taken from time to time of the actual amount of this travel carried on the respective trains, which percentages are applied monthly to the sales as shown by the agents' reports."

The New York Central now has ticket receivers at New York, Syracuse and Buffalo.

"Salaries in the Station Service" is the title of a pamphlet that has been issued by the Station Agents' Association for the purpose of stimulating the members of the Association to more intelligent activity in getting their pay increased. It consists chiefly of essays, reprinted from "The Station Agent," setting forth the arguments for paying agents at small and medium-sized stations better salaries. These essays have been heretofore noticed in the *Railroad Gazette*. The principal one is by Mr. R. I. Love, of the San Antonio & Aransas Pass, and it outlines a plan for paying each agent a lump sum for running his station, permitting him to rearrange his force of subordinates to suit himself. This would give him an opportunity to study economy in a practical way, and he would have definite ideas of the value of his own and his men's services to the road and of the relation of this to the amount of business done. The underlying idea of all that the Agents' Association has done and is doing is that every agent is a commercial agent, and should be paid in proportion to his ability in this direction rather than according to his value as a telegraph operator, switch tender or ticket clerk; and should be more immediately under the control of the traffic department. We have been asked to give our opinion of the pamphlet and of what it represents. The agents have certainly taken a very straightforward and sensible way of airing their "cause." The President of the American Railway Association in a recent address intimated that the agents would probably "organize"—that is, "prepare to be able to strike—if the companies should not treat them as well as they treat those of their employees who are banded in brotherhoods, but this association disavows any intention of employing threats or anything but civil persuasion, and in this it is doubtless right. Agents are too few and far between, even in the most populous sections, to extort any advantage out of their employers by force. Their work cannot be classified very well, and, like the superintendent, the agent is so greatly dependent for his efficiency upon intimate acquaintance with the men he has to deal with (which acquaintance can be acquired only by a residence of one, or two or more years) that it is only now and then that a man perfectly fits his place. A road can, in a pinch, get along without agents, or with very poor agents, for a while, so there is no use in striking. It follows therefore that the most an agent can do to better himself is to strive to fit himself for his place and to cultivate the polite and persistent knack, without cheekiness, of letting his superiors know what a good man he is.

Mr. Ralph W. Pope, Secretary of the American Institute of Electrical Engineers, recently read before the Institute a paper on the question of monthly meetings, developing some notions as to the means of increasing interest in the papers and discussions. The main idea is the division of the monthly meetings into sections for the purpose of overcoming the geographical difficulty, which is the main one. He suggests that the meetings might be held simultaneously at various points throughout the country. The paper for any one set of these simultaneous meetings could be put in type and distributed to the members, and at those points at which the author cannot be present a member could be selected to read the paper who would be willing to prepare himself to answer questions coming up in the discussion. The report of the discussion might be sent to the Secretary and revised by the editing committee; and it is suggested that more or less duplication of ideas could be left out of the printed discussions by a judicious use of brackets, to the effect that [in the Chicago section Mr. A raised a similar point]. Mr. Pope thinks it reason-

able to suppose that such a division of meetings into sections would awaken interest because of the thoroughness of the discussion as well as the novelty of the plan, and, being an electrician, he suggests that the long distance telephone could be called into use, putting each section into communication with the author. In order to insure audiences of sufficient size to make the meetings interesting it is suggested that the normal audience could be increased by establishing a list of "provisional members" or "auditors" who would be simply invited guests and who might be permitted to take part in the discussion and to whom notices could be mailed. In order to provide a fund for the increased expenses of the sectional meetings it is suggested that a small fee could be allotted on the "auditors." It is suggested that various institutions of learning would like to provide meeting rooms, and that from the students could be drawn a very interested and intelligent class of auditors. Mr. Pope's suggestion is a novel one, and might be considered by other technical societies, as for instance the American Society of Civil Engineers, although in the case of this society the local organizations in many of the larger cities already furnish a sufficient opportunity for engineers to read papers and talk about them.

TRADE CATALOGUES.

Transmission of Power by Electricity. Westinghouse Electric & Manufacturing Co., Pittsburgh, Pa.

This catalogue of 65 pages, 8 x 10 in., copyrighted, gives instructive information and data concerning the best methods and the means and the cost of transmitting power, together with a comparison of the advantages and disadvantages of direct and alternating currents for transmission. Considerable space is given to the description of transformers and alternating current generators, with special reference to their value in the transmission of power. Several systems are described, including the alternating, the synchronous, the two-wire alternating system and the multiphase system, and the advantages of the one over the others are discussed. The book also describes and illustrates the company's auxiliary apparatus, switchboard instruments, rheostats, compensators, insulators and the general mechanical features of the machines.

Railway Apparatus, published by the same company, is a catalogue of electrical railroad apparatus of 57 pages; it is 8 x 11 in., and is copyrighted. It treats of the field armatures and connections of the motors offered by this company for the motive power of street electric cars, and of the same parts of generators for supplying electricity for these purposes. The book concludes with a table giving the capacity, voltage, amperage, dimensions and weight of the machines manufactured.

Both of the above books are devoted to the description, illustration and setting forth of the superior construction and operation of the Westinghouse machines. A distinguishing feature, and one that adds particular value to these books, is in showing the parts of the machines in successive stages of construction and some of the apparatus in section and with parts removed, so that the reader may get a clear and comprehensive idea of their construction and the theory upon which they work. The books are truly valuable contributions to the literature of electricity, and are in material and workmanship superior to any technical books published for the trade.

Tests of Reynolds-Cortiss Engines. The Edw. P. Allis Co., Milwaukee, Wis.

This celebrated firm of builders of engines and other machinery has lately issued a pamphlet containing reports of tests of several of its Reynolds-Cortiss engines. This company has during the past fourteen years manufactured upward of two thousand Cortiss engines, and as the result of extensive tests draws the following conclusions as to steam consumption under favorable conditions:

Single cylinder non-condensing engines, 24 to 26 pounds of steam per horse power per hour.

The same engines condensing 19 to 21 pounds per horse power per hour.

Compound non-condensing engines 19 to 21 pounds per horse power per hour.

Compound condensing engines 14 to 16 lbs. per horse power per hour.

Triple expansion engines 12 to 13½ pounds per horse power per hour.

Quadruple expansion engines are advised where high steam pressures are employed or where, for mechanical reasons, a four cylinder machine is desirable.

Practical Instructions for Using the Steam Engine Indicator. Crosby Steam Gage & Valve Co., Boston, Mass.

This is a small hand book, the purpose of which is to enable the engineer of average intelligence and ability to understand the design, construction and application of the steam engine indicator, to use the instrument and to deduce from the diagrams taken such information concerning the working of the engine as can be deduced therefrom. The instructions given are very explicit and cover all points liable to come up. Especial attention is given to the measurement of the diagram, both by ordinates and the use of the planimeter. Chapter IX., on the throttling calorimeter, is especially interesting, giv-

ing a description of the instrument, its theory and directions for use. Part Second, by Mr. Albert F. Hall, will be found very useful to young engineers, as it embodies modern scientific theories concerning the generation of steam and the correct methods for making boiler and engine tests, and the computation of the steam consumption of an engine from the indicator diagrams. Full data and computations for each step are given, thus making the work intelligible to all interested students.

The Venturi Meter. Builders' Iron Foundry, Providence, R. I., U. S. A.

The above firm has recently issued in pamphlet form some very interesting and valuable information concerning the Venturi meter and the principles underlying its construction. There is given, together with several very good illustrations of the instrument, a short description in which are set forth the advantages of the meter, a reprint of the paper read by Mr. Clemens Herschel before the American Society of Civil Engineers in 1887, and also of Article 71, from Merriman's "Hydraulics," in which is briefly given the theory of the instrument. Tests are also given of instruments of various sizes, as well as illustrations of the 36 inch meter used for measuring the main water supply at the World's Columbian Exposition, and the 6-inch meter used by the Waukesha Hygeia Mineral Springs Co., at their pavilion on the Exposition grounds.

The attention of railroad men who have occasion to measure water taken from city supply is especially called to this apparatus.

Catalogue of Fittings, etc., for the Pintsch Gas System and Catalogue of Steam Heating Apparatus. The Safety Car Heating & Lighting Co., 100 Broadway New York, and Monadnock Building, Chicago, Ill.

The company issues two detailed and useful catalogues, the scope of which is sufficiently indicated by the titles. The catalogue of lighting apparatus shows a great variety of parts, being everything that is necessary to the complete car equipment of the Pintsch system, including pictures of the most recent lamps, some of which are indeed very handsome.

The steam heating catalogue shows the standard system using water circulation with the Baker heater, and gives diagrams of the system as introduced in various years, beginning with 1889. It shows also the direct steam regulating system, the Gibb's coupler and the necessary locomotive equipment.

Machinery Bulletin No. 7. Rice Machinery Co., Chicago, Ill.

These bulletins, which are mailed to manufacturers and mill owners at irregular intervals, are devoted to the introduction of the power transmitting machinery and mill supplies handled by the above firm. Each number contains, besides the illustrations and descriptions of their various specialties, one or more special articles on various pertinent subjects. No 7 contains a short article by H. H. Suplee, of the Yale & Towne Manufacturing Co. on Light versus Heavy Pulleys.

TECHNICAL.

Manufacturing and Business.

The total sales of the Consolidated Car-Heating Co. in 1893, including October, are slightly in excess of the sales at the same period last year. Within the last week orders for electric heaters have been received from 21 additional roads, making a total of 51 street lines in the United States and Canada which are using or about to use the Consolidated Co.'s electric heaters.

The Cincinnati Railway Tie & Lumber Co., of Cincinnati, O., has been incorporated with \$25,000 capital stock, by Robert Ballard, I. W. Cherington, R. H. Fleming, A. C. Cherington and John H. Ballard.

The Taylor Car Door Co., of Cincinnati, O., has been incorporated with \$5,000 capital stock, by A. B. Taylor, W. L. Granger, T. B. Stone, Charles C. Taylor and T. C. Taylor.

The New York Engineers' Supply Co. has been incorporated in New York recently. The directors are: Samuel B. Libby, William Dwight Winan, New Brighton; Edward P. Libby, West New Brighton; James Byxbee, Brooklyn; William Warner, West New Brighton; Robert A. Caird, Brooklyn.

The Westinghouse Air Brake Co. will resume operations in every department at its Wilmerding works within a short time, after an idleness of several weeks while extensive repairs were being made.

The Lodge & Davis Machine Tool Co., of Cincinnati, O., has received a large order from the Cleveland, Cincinnati, Chicago & St. Louis road for lathes and other tools to be used in the new shops of that company at Bellefontaine, O. Recent orders have been received by this firm from the United States Government for navy yard tools, and from a German firm.

The plant of the Springfield Emery Wheel Co. has been removed from the corner of Howard avenue and Spruce street to the corner of Water street and South avenue, Bridgeport, Conn. The present location is nearer the business center of the city, while the shipping facilities are improved. The company has had enough business to keep the works going through the summer, and has a number of orders on hand at the present time.

The Van Dorston Railway Supply Co. has completed a

non-cushioned automatic car coupler consisting of a modified construction of the improved Columbian universal coupler, M. C. B. type. The same lock, knuckle and uncoupling mechanism is used, the only difference being in the absence of the cushioned feature. It is intended to demonstrate the value of the cushioned feature of the coupler. It is claimed that the cushioned type will stand three times the number of blows that one of the non-cushioned bars will, under the same conditions.

The Committee of creditors of the Gilbert Car Co., of Troy, N. Y., has formulated an agreement which all unsecured creditors are asked to sign. This Committee consists of Henry S. Hale, of Philadelphia; William E. Uptegrove and Charles R. Flint, of New York City; James L. Howard, of Hartford, Conn.; William Kemp, of Troy, and Ralph W. Kirkham, of Albany, and represents about \$500,000 of unsecured claims out of a total of \$620,000. The Committee is satisfied that if the assets are permitted to be sold by the Receiver they will not exceed the mortgages and judgments now liens on the property. It is not thought to be practicable at the present time to attempt to reorganize the company, and the chance of reorganization or of a favorable sale hereafter would be much better if the property should be taken out of the hands of the Receiver. The Committee asks each creditor to transfer his claim to the Committee as trustees, and the court will be asked to order the transfer of the property now in charge of the Receiver appointed in August to the Committee, with authority to operate the works. The Committee made it a condition to the formulation of this plan that the members of the Gilbert family release their liens and judgments, amounting to about \$295,000, and share equally with the unsecured creditors. This they have agreed to do if all the creditors sign the proposed agreement.

Iron and Steel.

It is stated that the steel rail mill located at Alexandria, Ind., last spring by the New Albany Rail Mill Co., and which was partially completed when the De Pauw failure occurred, will be finished by the Union Trust Co., which was made assignee of the De Pauws.

An addition to the Homestead works of the Carnegie Steel Company is soon to be erected. It will be a new blooming mill to replace the one now in the 28-in. mill. The machinery will also be replaced.

Nov. 7 operations were resumed at the Harrisburg Rolling Mill, after a shut-down since Aug. 1. There are enough orders on hand to keep the mill going for two weeks. About half the full force is employed.

Several departments at the Cambria Iron Works, Johnstown, Pa., have resumed, giving employment to about 300 men.

New Stations and Shops.

The Grand Trunk road has submitted plans to the city of Stratford, Ont., of the proposed car shops that it is understood are to be erected in Stratford if the City Council and the company can come to an agreement. The plans provide for the erection of freight car shops 350 x 127 ft., iron and wood machine shop and boilerhouse, 90 x 370 ft. These two buildings would make an "L." The other buildings would be parallel with the freight car shops, as follows: Passenger shops 410 x 76 ft., and varnishing shops 300 x 76 ft. Provision is also made for an addition of 140 x 90 ft. in the blacksmith department of the present shops.

The Boston & Maine has decided to re-establish a roundhouse at Woburn, Mass. A temporary structure with four stalls will be built and used until a permanent roundhouse can be erected.

The Turner & Seymour Manufacturing Co., at Torrington, Conn., has decided to build a new foundry entirely of iron and brick. The iron roof will be furnished by the Berlin Iron Bridge Co., of East Berlin, Conn., and will consist of iron trusses and iron purlins covered with the Berlin Iron Bridge Co.'s patent anti-condensation corrugated iron. The building will be fireproof, and it is the intention of the Turner & Seymour Manufacturing Co. to carry no insurance on the building, as the Berlin company guarantees that if all the wooden flasks in the building were piled in one place and fired that the roof would suffer no damage.

The Chicago Main Drainage and the Illinois River.

The Chicago Drainage Trustees, to the number of six, with engineers, attorneys, etc., passed down the Illinois River the first days of this month, stopping at La Salle, Peoria, Beardstown, Alton, etc. The objects were to see how much damage would be done by overflows from the additional volume of water added to the stream; to get acquainted with the valley and its inhabitants, and to enlighten them as to the advantages which will follow a deep navigation without locks. Incidentally the visit will probably be utilized to gain influence in favor of an improvement of the Des Plaines below Joliet, and the Illinois, by the General Government. This is considered advisable, as there is at present some hostility to the project in St. Louis.

Filling the Manchester Canal.

Water was admitted to the whole length of the Manchester Ship Canal Nov. 7. It is expected that it will take two weeks to fill it. The first steamer is expected to make the passage from Liverpool to Manchester on Dec. 1.

THE SCRAP HEAP.

Notes.

The Pennsylvania road is making its biennial test of the eyesight of trainmen, telegraph operators, etc.

The Suez Canal was recently blocked for a time by the burning of a steamer and by the subsequent work of removing the wreck.

There has been a serious cave-in in the Mullan Tunnel, on the Northern Pacific, and through trains were obliged to run by way of Butte.

Bartlett Brown, a block signal man of the Pennsylvania road near Marion, N. J., dropped dead in his tower on Nov. 3 from heart disease.

An order has been issued on the Chicago & Alton requiring that the engineers of passenger trains, before starting, must always get a signal from the rear brake man that the brakes are off.

According to statements in Southern papers, the Superintendent of the Louisville & Nashville has stated that he repaired the damage to his road, which was caused by the recent storm between Mobile & New Orleans, for less than \$100,000.

If any set of men are glad that this world's fair is over it is the freight crews. They have been laid out so much that it came to be the general understanding that when a train took a side track it was likely to remain until several sections of passenger trains passed. To be on the road 20 hours on a run was a common occurrence. —Pittsburgh Post.

The newspapers of Ohio have lately had a good deal to say about the construction of vestibules on the platforms of electric street cars for the protection of the motormen in cold weather, such protection being required by a law recently passed. A Tacoma paper states that such inclosures are being built upon the platforms of cars in that city at the expense of the motormen, three men paying \$5 each (\$15) for the work on each car.

Within the past two weeks the Duluth, South Shore & Atlantic has located its freight headquarters at Duluth, to be followed in the spring by its general offices; the Eastern Minnesota has put its general manager there, and four fast freight lines have put agents there. These last go to the head of the lakes, because of the wonderful increase in flour milling capacity there. The flour output for the last week was nearly 85,000 bbls., and has averaged for a month over 50,000 bbls. weekly. Three years ago it was at 10,000 a week.

At Oliphant, Ark., on the night of Nov. 3 a passenger train of the St. Louis, Iron Mountain & Southern was stopped by highwaymen and the passengers and express car robbed. It is not stated how much booty was secured, but the conductor was shot dead by the robbers when he tried to defend the train. Five of the robbers were subsequently captured, two of them being wounded. It is said that they attempted to stop another train the same night. Near Coal Creek, Tenn., on the East Tennessee, Virginia & Georgia, two men attacked an express train on the night of Nov. 3, and one of them was killed. The other man was captured, the company having had a strong guard on the train.

At Hillsboro, Ill., recently a brakeman of the Toledo, St. Louis & Kansas City, who was discharged from the service of the company, recovered in a suit a month's wages from the company for work not performed. It is said that when the road went into the hands of Receiver Calloway he made an agreement with the employees that none of them should be discharged at any time without a month's notice or at least a full hearing as to the cause. The plaintiff while braking made an error which caused a slight accident and was discharged. The Court holds that the agreement made by Calloway must be lived up to, and gives judgment for costs, etc., to the amount of \$153. The road will appeal.

Press dispatches report that the yardmen of the Cleveland, Cincinnati, Chicago & St. Louis at Cairo, Ill., who struck on Nov. 2 against a reduction in wages, succeeded in stopping all traffic, including passenger trains to and from that city, on that road for several days. The accounts state that only four men had their pay reduced, but that 50 struck. One dispatch states that "no passenger trains are allowed to leave the yard," but in the same paragraph the men are said to be quiet, "making no threats of violence!" A truce was agreed upon Nov. 5.

A Baltimore dispatch of Nov. 4 says that Vice-President King, of the Baltimore & Ohio, announces that there will be no reduction of wages on that road.

All of the lines leading to Chicago which put on additional regular passenger trains for the World's Fair are now taking off some of them. The Cincinnati lines have taken off two or three each. It is announced from Philadelphia that the Columbian express of the Pennsylvania and the Exposition Flyer of the New York Central will be taken off Nov. 19. Other accounts seem to indicate that the New York Central has not fully decided whether to take off the Exposition Flyer or to leave that on and perhaps take off some other train.

It is announced that the train of Wagner palace cars exhibited at the World's Fair, together with the Lon-

don & Northwestern train, including a locomotive, and the full size model of the New York Central train of 1831, are to be placed on exhibition for a few days in each of the principal cities on the line of the New York Central.

South American Notes.

The Donna Thereza Christina Railway Co., Brazil, estimates the cost of ties, delivered, as follows: Native Brazilian wood, 20 cents each; creosoted Baltic pine, \$1.03 each; steel ties, \$1.24 each.

During the present blockade of Rio de Janeiro by the insurgent fleet of Admiral de Mello, the Rio Gas Company is economizing its store of coal by the use of bituminous shale from Taubate for the manufacture of gas.

The Recife & São Francisco Railroad Co., Brazil, has declared an interim dividend for the half year ending June 30, 1893, at the rate of six per cent. per annum. The total receipts for the half year were \$445,000, with working expenses amounting to \$285,000. The length of the line is 77½ miles. The debt of the company, which was originally \$1,265,000, is being gradually extinguished, the amount still unpaid being \$855,000.

The Argentine National Railroad Board has recommended fixing by law the rate of speed for freight trains. The speeds suggested are on an ascending scale in proportion to the distance traversed, varying from 4 kilometers per hour for distances less than 200 kilometers, up to 10 kilometers per hour for distances exceeding 1,200 kilometers.

The Guanta Railway, Harbor & Coal Co., of the State of Bermudez, Venezuela, having gone into the hands of a receiver, its valuable properties, including 23 miles of railroad, the coal mines of Neveri, capable of producing 1,500 tons of coal *per diem*, and a pier at Guanta, with a concession to collect the dues of the port, are now offered for sale. The company came into financial straits through injudicious expenditures in the beginning, and then found itself unable to secure the necessary capital for working the mines. It is thought that \$350,000 will buy the properties and concessions.

Dropping Bricks 118 Ft.

A rather ingenious method of taking down a 118-ft. brick chimney was recently followed near Aachen, in Germany. A cast-iron box with an air-tight hinged door was placed in the interior of the chimney at its base, from the top of this box a wooden chute was carried up the shaft, being held in position by stays from the walls. The chute was made up of 10-ft. lengths with cast-iron couplings at the joints which latter were wrapped with tarred rope for tightness. The clear sectional area of the chute was a trifle greater than the cross section of the bricks, and the latter were simply dropped into the chute and landed in the cast-iron box below without damage. The door at the base was fitted with a rubber packing ring to guard against air leakage, and the seams in the wooden chute were closed up with white lead. As the chimney grew shorter the chute was simply sawed off to keep its top within easy reach of the workmen. If we mistake not, a quite similar method of taking down a chimney was carried out in this country a few years ago.

Some Swiss Railroad Statistics.

A compilation of rolling-stock statistics for all the railroads of Switzerland up to the end of 1892 has been issued by the Inspection Bureau of the Swiss Railroad Department. It appears that the total number of locomotives in service at the end of 1892 was 876, including not only the various rack rail locomotives, of which there were, in all, 65, but also the engines employed on the several steam tramway lines, numbering 88 altogether. The oldest locomotive in use dates from the year 1855, and the oldest locomotive boiler was built in 1864. At the close of 1887 the number of locomotives amounted to 655, of which only 18 were of the rack-rail class. Of passenger cars there were, at the end of 1892, 2,438, against 1,970 at the end of 1887. Two hundred and seventeen of the cars were provided with foot-warmers in cold weather, 213 were heated by stoves, 327 had warm-air heating arrangements and 1,136 were heated with steam, the remaining 495 cars being without heating apparatus of any kind. One hundred and fifty-three cars were equipped with electric light; on 369 gas was burned, while the rest were fitted up with oil lamps. Of baggage cars there were 424 at the close of 1892, as compared with 351 at the close of 1887. The freight cars at the ends of the two years numbered 10,269 and 8,907 respectively.

Chicago City Railway Co. Dividends.

The Chicago City Railway, which a few weeks ago declared a regular quarterly dividend of three per cent., an extra dividend of two per cent., and distributed among its stockholders \$4,500,000 in stock and \$3,000,000 in bonds of the Chicago & South Side Rapid Transit Company ("Alley Elevated"), has now declared an extra cash dividend of 10 per cent. The officials of the road claim to have collected about 73,000,000 cash fares between May 1 and Oct. 31.

The Latest Novelty in Collisions.

PREDMONT, W. Va., Oct. 29.—While several Baltimore & Ohio Railroad track-repairmen were returning from work on the seventeen-mile grade their hand car collided with a helping engine in a tunnel near here, badly injuring a number of them. The hand car was running at a very high rate of speed and overtook the helper.—*Baltimore Sun*.

Irrigated Railroads.

All have heard of the profitable results of irrigation of railroad securities, but the Southern Pacific in California is probably the first to have its roadbed irrigated, or rather to be obliged to resent the operation of a law which compels it to pay for an irrigation of its roadbed which is neither sought nor in any manner desired. E. Black Ryan, the tax expert of the Southern Pacific Company, has been cited to appear before the Board of Directors of the Central Irrigation District, Colusa County, and show cause why the assessment of the railroad in that district should not be raised. While Mr. Ryan is never at a loss for more or less plausible reasons why the railroad should not be taxed, in this case he has an entirely new line of argument to develop. A contest in the courts will probably be brought about to settle the question of the railroad's liability for taxes for irrigation purposes in districts organized under the Wright law. This law is a unique one in the West, being framed for the purpose of levying taxes on all lands within the limits of irrigation districts to defray the cost of constructing and maintaining irrigation systems.

But, as the roadbed and ground within the right of way of the railroad require no irrigation the Southern Pacific takes the position that it is not liable for irrigation taxes, except on lands in the grant outside of the right of way. It has hitherto avoided a contest by a sort of compromise. While the corporation refused to admit its liability for irrigation taxes, it offered to pay a tax on \$2,000 per mile of the road inside the limits of the districts to avert legal contention. This proposition was accepted, and has been abided by up to the present time. Recently, however, a new set of directors was elected for Central District. One of the first things the new board did was to raise the assessment of the railroad from \$2,000 a mile to \$6,500 a mile. As the company protested Mr. Ryan has been summoned to appear and show cause why the raise should not be made. The Southern Pacific has a large mileage in the different districts, and the matter will probably be taken into the courts for adjudication.

The Lake Street Elevated Road.

The *quo warranto* proceedings instituted by the State's Attorney against the Lake Street Elevated Railroad of Chicago have been dismissed by order of Judge Brentano. As to the question of public injury, which would be entailed by the operation of the road, the court considered that the public as a whole would be benefited, and that if owners of property along the line of road are injured by the construction of the road they have their remedy in their own name, but it was not proper that the name of the people should be used in a proceeding of the kind if there was no public injury to be prevented.

Railroad Taxes in New Jersey.

The New Jersey State Board of Assessors has filed a preliminary report which shows that the railroads and canals in New Jersey will this year pay about \$1,500,000 state taxes. Of this amount \$1,112,341 will go into the state treasury and \$425,618 will go to local uses. This is a total increase of \$110,880. The total assessed valuation of railroad and canal properties in the state is \$222,468,369, an increase of over \$8,000,000.

Shipments Through the Sault Ste. Marie Canal.

Shipments out of and into Lake Superior for the fiscal year of the canal ending June 30 were 4,668,000 gross tons of iron ore, 620,531,000 ft. of lumber, 2,771,667 tons of coal, 40,965,000 bushels of wheat, 5,627,778 bbls. of flour, besides other freight aggregating 10,226,900 tons. A total of 12,160 vessels went through the canal, and 23,919 passengers were carried. The operation of this canal and works for the year cost about \$42,000.

No Flies on This Station Agent.

A novel suit was decided in the Court of Common Pleas of Belmont County, O., last Thursday. A. B. Gilmore was engaged, without specific contract, as station agent and telegraph operator for the Wheeling Bridge & Terminal Railway Company at Martin's Ferry, O., three years ago. A few weeks ago he left the employ of the company, and presented a bill for \$523.28 for overtime which he claimed to have worked. This included regular wages for all Sundays and all time put in by him on account of late trains or otherwise over 10 hours a day. Payment was refused and suit brought. The case was ably argued, and resulted in a verdict for the full amount, the company not having any means of controverting the plaintiff's statements of time worked.

Lake Notes.

The shipping season on the lakes is very near its close, with a shortage of about 40 per cent. in shipment of iron ore, a small shortage in coal and an increase in wheat. This is said to have been the poorest season for vessel owners since the advent of the large steel carriers. So far no predictions can be made as to winter operations on the iron ore ranges. In some instances wages have been reduced, by amicable agreements with the men, to the level of those paid in the "fifties," and mines which have secured such reductions will probably work all winter, but there is at present no prospect that such low wages will be generally accepted, and the winter's output will probably be small.

The shipments of coal from Buffalo, by months, for 1892-93 have been as below:

	1893.	1892.
October.....	359,165	516,523
September.....	390,168	377,562
August.....	252,915	247,532
July.....	254,070	412,814
June.....	391,580	374,069
May.....	363,435	273,463
April.....	178,040	112,419

Totals..... 2,189,763 2,344,432

Last November and December the shipments of coal aggregated 507,898 tons, a figure which apparently will not be reached this year. The rates are: 50 cents to Chicago and 25 cents to Duluth.

The Great Northern Railway, which the readers of the *Railroad Gazette* will remember is building two fast passenger steamers at Cleveland for the route between Duluth and Buffalo, has made a shipment of tea via the lakes. The tea was shipped at Hong Kong to Seattle, and by the Great Northern to Duluth and then by the "Northern Queen," of the Great Northern freight line, to Buffalo, and by rail to New York. It is said this is the first shipment of tea through the lakes.

During the season of the Chicago Fair the great whale-back Christopher Columbus has carried over 1,750,000 passengers who paid fares; this includes 52,500 carried between Chicago and Milwaukee on Sundays. On one of these trips she covered the distance, 84 miles, in 4 hours and 6 minutes, or a speed of about 20½ miles per hour.

Speaking of the American tendency to fast speeds for water-borne freight in the notice of the sale of steamers to Brazil in the *Railroad Gazette* of Nov. 3, reference was made to the speed lake marine, The Centurion, built by F. W. Wheeler & Co., which is the latest launched and largest of these boats, recently made the run from Buffalo to Duluth, 97 miles, in 76 hours and 50 minutes, an average speed of 14.7 land miles, or 12½ knots, per hour. As this run included the shallow passages through Lake St. Clair and St. Mary's River, it will be recognized as a very creditable speed. The *Marine Review* gives the following dimensions, etc., of the Centurion: Length over all, 378 ft. and 6 in.; extreme breadth, 45 ft., 2½ in.; depth, 26 ft. The plating butts are overlapped, and all of the steel used in her construction was tested to 60,000 lbs. tensile strength with 25 per cent. elongation in 8 in. She has a double cellular bottom 54 in. deep, with capacity for 1,500 tons of water; is steam heated throughout, and lighted with electric lamps, having a 210-light dynamo. The engines have three cylinders 23, 37½ and 63 in. in diameter, with 44 in. stroke. The steam is supplied

at a pressure of 170 lbs. by three cylindrical return tubular boilers, 12 ft and 6 in. diameter by 12 ft. 8 in. long. The wheel is 13 ft. and 6 in. diameter, pitch 18 ft.

As a result of the Centurion's trip to Chicago, in which she found the drawbridges on both the south and north branches of the Chicago River impassable, formal complaint was made against the bridges as unreasonable obstructions to navigation. Captain Marshall, of the United States Engineer Corps, is examining the situation, and will report to the Secretary of War, who will decide if the Chicago River is to expand in the future with the new boats, or if it will limit their size.

BRIDGE BUILDING.

Buckhannon, W. Va.—A recent rise in the Buckhannon River washed out the foundations of the Hudkins bridge, leaving no means of crossing the river at that point. A proposition has been made by the town council of Buckhannon to defray half the expense of a new bridge with the county court of Upshur County. The proposition is to build a new steel wagon and foot-walk bridge 20 ft. wide and 150 ft. long.

Canadian Pacific.—Chief Engineer Peterson has just returned from an inspection of bridges under construction on the Western lines, including the two great iron bridges, the one over the Salmon River, near the North bend, and the other over Stony Creek, at the summit of the Selkirk. The latter bridge is 300 ft. above the valley, and its span is about 330 ft. Another iron bridge is to be constructed at the Kicking Horse River, at the summit of the Rockies.

Corning, N. Y.—A new bridge will be erected on the site of the structure destroyed by fire on the night of Nov. 1. It connected the Fall Brook station at Lawrenceville, Pa., with the village, and its destruction was the work of an incendiary.

Council Bluffs, Ia.—The City Council has voted to advertise for bids for the construction of an iron bridge over Indian Creek on North Seventh street.

Duluth, Minn.—The joint committees from Duluth and West Superior have settled upon the Commercial Bridge Company's plan as the one best adapted to the interests of both cities. This contemplates a combination bridge providing for the passage of foot passengers, teams, street cars and railroad trains. The bridge is to be constructed of iron or steel and is to be 21 ft. above the water. Work must be begun within one year after the passage of the enabling act by Congress, and the bridge must be completed within two years. The bridge may, at any time, be purchased jointly by the cities of Duluth or West Superior, or by Douglas and St. Louis counties. Neither of the cities or counties, however, may make the purchase separately. The point to be bridged is the one so long in controversy, from Rice's Point, Duluth, to Conner's Point, West Superior.

There are now two bills before Congress providing for the erection of a bridge connecting these cities. The contending factions will now unite upon this project and there does not appear to be any valid reason why Congress should delay the passage of the bill when it is amended to include the provisions agreed upon by the citizens of both cities.

Elmira, N. Y.—Some fine bridge building is about to be begun on the New York, Lake Erie & Western. On the Delaware Division bridge No. 6 will be changed to a steel structure 130 ft. long, the weight of which will be 700 tons. A 750-ton bridge with two plate girder spans will be erected on the Susquehanna Division.

Harrisburg, O.—The bridge over the Big Darby, at Harrisburg, has been let to the Columbus Bridge Company at its bid of \$10,840.

Lincoln, Neb.—The City Engineer is making plans for two viaducts over railroad tracks, each about 1,745 ft. long, three truss spans covering 364 ft., the rest girder.

Meaford, Ont.—The ratepayers will be asked to vote the sum of \$1,500 toward the erection of a bridge over the Big Head River at Trowbridge street.

Red Wing, Minn.—C. F. Loweth, C. E., of St. Paul, has been engaged to prepare the plans for the steel wagon bridge to be erected by this city across the Mississippi River.

Spokane, Wash.—The board of public works formally let the contract for the Post Street bridge to the San Francisco Bridge Co. for \$15,755. The work is to be completed by March 4, 1894. The bridge will be an all steel truss bridge, having one span of 240 ft. in length. The approaches make the total length about 400 ft.

St. Cloud, Minn.—The City Council has decided to advertise for bids for replacing the present wooden bridge at St. Germain street with a steel structure. The estimated cost is \$45,000. This bridge has been a bone of contention for the past year. Frank Smith, City Engineer, is in charge of the work.

St. Paul, Minn.—The city council has directed the city engineer to prepare plans for a bridge across the right of way of the Chicago, Milwaukee & St. Paul, at Summit avenue. He has also been instructed to investigate the matter of a change of grade at the crossing of the same road at West Seventh street. It is probable that an overhead highway bridge will be constructed, as that plan would be less expensive and in several other ways more feasible.

Warren, Pa.—The contract for the iron superstructure of the bridge to connect this borough with Glade was awarded last week to the Groton Bridge Co., of Groton, N. Y. The bridge will span the Conewango Creek and cost upward of \$15,000.

Westerville, O.—The contract to erect the bridge over Alum Creek, at Westerville, has been let to the Wrought Iron Bridge Co., of Canton, at its bid of \$9,640. The structure is to be 140 ft. long.

Wilkes-Barre, Pa.—The Grand Jury of Luzerne County has recommended the building of iron bridges in the following counties, the figures representing the amount to be paid by the county: Across Little Bear Creek in Wright Township, \$400; across Kitchen Creek in Fairmount Township, \$600; across Little Nescopeck Creek in Sugar Loaf, \$1,200; over Solomon's Creek in Ashley Borough, \$750; across Gardner's Creek in Plains, \$800; across Toby's Creek in Luzerne Borough, \$1,500; across Abram's Creek in Kingston, \$500; across Three Cornered Pond Creek in Lehman, \$1,000.

York, Pa.—A new iron bridge is being constructed by the Northern Central near this city. It replaces an old covered wooden structure.

RAILROAD LAW—NOTES OF DECISIONS.

Carriage of Goods and Injury to Property.

In Wisconsin the plaintiff's horse, being frightened by defendant's train at a crossing, jumped the cattle guard, and ran along defendant's right of way for about a mile, until it became entangled in a bridge, and was injured. It was not claimed that the horse was touched by the train, but negligence was found by the jury in that the engineer did not stop the train before it reached the crossing, whereby the horse was frightened. The Supreme Court holds that the fright could not be regarded as the proximate cause of the injury.¹

In Texas it is ruled by the Supreme Court that though it is "the duty of a party to protect himself from the injurious consequences of the wrongful act of another, if he can do so by ordinary effort and care, or at moderate expenses," such rule has no application in an action for damages against a railroad for the destruction of plaintiff's crops by overflow, from the defective construction of defendant's roadbed, where the injury could only have been prevented by the digging of a ditch at a cost of \$300; the digging of a ditch at such cost not being "ordinary effort and care" or a "moderate expense."²

In New York it is held by the Supreme Court that a railroad should exercise as great a degree of care to protect the public against damage by fire as it exercises in favor of its patrons.³

The Federal Court of Appeal rules that an occupant of land adjoining a railroad is not bound to protect a haystack 250 yards from the line of road from sparks from passing engines, either by making fire guards or by plowing around it. Nor is it contributory negligence to leave the land between the stack and the railroad track in its natural condition.⁴

Injuries to Passengers, Employees and Strangers.

In a case in the Federal Court of Appeals the deceased, a passenger, while seated in a sleeping car, was approached by an insane person, who remarked: "It's a sad thing that they are trying to kill me, and I am a defenceless man." Shortly afterward he shot deceased. The person was recognized by the officials of the car as having been transported over the line 19 days before, at which time he was in chains, violent, in charge of police officers, laboring under a delusion of pursuit by Jews. At the time of the shooting he was unattended, and prior thereto had made the same remark to a number of persons that he made to deceased. It further appeared that he had a dull and sullen look, which might indicate insanity, and had applied to the conductor of the train for protection. The Court reverses a verdict in favor of the railroad, and holds that there is a duty on the railroad to protect passengers from insane persons on the train with its knowledge.⁵

The Supreme Court of Mississippi rules that where a railroad received a sick passenger, with the consent of the conductor of the train and the ticket agent, who were informed of his serious illness, and of the necessity of his having assistance when he should arrive at his destination, but the conductor failed to have him aroused and put off there, but carried him 30 miles beyond, where he was put off alone, at a small station, at 2 a. m., and allowed to remain there 40 hours before being returned to his destination on one of the company's trains, and his illness was so increased during his exposure that he died, the company is liable.⁶

In New Jersey a passenger passed from a boat by a way upon the ferry bridge, provided for animals and vehicles. As he was so doing a runaway horse, belonging to the railroad company, careering at random about the ferry house, jumped over a bow, which aided in the support of the ferry bridge, into the way where the passenger was, and injured him. The Court of Errors and Appeals holds that by being in the way indicated the passenger was not guilty of negligence which contributed to his injury.⁷

In New York it is laid down by the Supreme Court that a train dispatcher, vested with discretionary power as to the running of trains and authorized to change the running time from that fixed in the time-tables of the company, represents the company, and a locomotive engineer may recover from the company for injuries sustained in a collision between his train and another train, also running under the direction of the train dispatcher and resulting from the engineer's obedience of the train dispatcher's order to run his own train ahead of time.⁸

In Indiana it is held that in an action against a railroad for causing the death of a brakeman by reason of the defective condition of a coupling, the fact that a rule of defendant company required all brakemen to examine the couplings of their trains will not charge contributory negligence to decedent, when it does not appear by the evidence that decedent knew of the existence of this rule.⁹

In North Carolina the Supreme Court rules that where a railroad brakeman enters into an agreement with the company waiving all liability for injuries resulting from any infraction of a rule of the company prohibiting brakemen from coupling cars except with a stick, and forbidding them to go between the cars to couple, an order by the brakeman's conductor, directing him to go between the cars to couple whatever he fails in an effort to couple with a stick, is a waiver by the company of the brakeman's agreement.¹⁰

In the Supreme Court of the United States it is decided that a railroad switchman, who has been employed as such in a switchyard for more than two months, being a man of mature age, assumes the risks incident to coupling cars belonging to other roads which have double deadwoods or bumpers of unusual length, although the cars belonging to his employer are not thus equipped; for a railroad company is not guilty of negligence in receiving into its yards and passing over its lines cars different from those owned by itself.¹¹

In Alabama plaintiff, a section foreman for defendant railroad company, was repairing a frog on a trestle, and two engines were waiting to cross as soon as the frog was repaired. Plaintiff testified that he notified the engineer of the first engine to cross slowly, so that plaintiff could observe how the frog and switch worked, and that he notified the other engineer to wait until signaled before crossing. The second engine crossed immediately after the first, and injured plaintiff, who was stooping down examining the frog. Plaintiff was not expecting the engine, and used reasonable diligence to escape, but it was too late. The Supreme Court rules that the charge that "a man under sudden excitement or peril is only required to exercise such care for his safety as an ordinarily prudent man would have exercised under like circumstances, and if he exercised such degree of care, then, in that, he is not guilty of contributory negligence," is proper and applicable to the facts as set out.¹²

In Indiana the plaintiff left his horse standing unhitched at the sidewalk, about 30 ft. away from the crossing, where it had frequently been left standing before, while plaintiff went the door of a store a few

feet away. When the horse became frightened by the steam of an approaching train, plaintiff took hold of it, before it moved from the place where it had been left, and held on to it until he was dragged some distance. The Supreme Court holds that the plaintiff was not guilty of contributory negligence, though a city ordinance made it unlawful to leave a horse stand unhitched on a street.¹³

In Missouri the plaintiff, while crossing a street, was injured, through the alleged negligence of an employee of defendant cable car company, who, it was claimed, so carelessly threw down a crowbar he had been using that it struck plaintiff. Plaintiff did not cross at the regular crossing, because it was muddy, but was passing diagonally over the street. The Supreme Court rules that evidence that it was very unusual for women to cross the street at this point, while not competent for the purpose of showing contributory negligence on the part of plaintiff, since she had the right to cross the street at any point she saw fit, was admissible to show that a greater degree of caution was required of her than if she had crossed at the usual place.¹⁴

In Indiana it is laid down that in an action against a railroad for injuries received at a crossing, it does not follow, from the fact that plaintiff was riding in a wagon with her husband, who had control of the team, that his negligence can be imputed to her.¹⁵

In Iowa, in an action against a railroad company for placing a dead steer on the highway, whereby plaintiff's horse was frightened, it appeared that the steer, which had been injured by a train, was removed from the track by a section boss and his men, killed, and then placed on the highway. The Supreme Court holds that the fact that the section boss and his men were not employed on the section where the steer was found could not be urged in defense, since it appeared that it was their duty to remove obstructions from the track when ever found.¹⁶

In New York it is held that a rule of a railroad company requiring its freight brakemen to examine for themselves the brake appliances before using them does not relieve the company from liability for injuries caused by defective brake appliances, unless it appear that the injured brakeman had time and opportunity to make such an examination as would have revealed the defect.¹⁷

¹ Lynch v. N. Pac., 54 N. W. Rep., 610.

² H. & S. A. v. Borsky, 21 S. W. Rep., 1011.

³ Babcock v. Fitchburg, 22 N. Y. S., 449.

⁴ C. & S. F. v. Johnson, 51 Fed. Rep., 474.

⁵ Meyer v. St. L., I. M. & S., 54 Fed. Rep., 116.

⁶ Weighman v. L. N. O. & T., 12 South. Rep., 585.

⁷ Watson v. C. & A., 36 Atl. Rep., 26.

⁸ McChesney v. Panama R. Co., 21 N. Y. S., 207.

⁹ E. & St. L. v. Utz, 32 N. E. Rep., 881.

¹⁰ Mason v. R. & D., 16 S. E. Rep., 698.

¹¹ Kohn v. McNulta, 13 S. Ct., 298.

¹² R. & D. R. Co. v. Farmer, 12 South. Rep., 86.

¹³ L. N. A. & C. R. Co. v. Davis, 33 N. E. Rep., 451.

¹⁴ Henry v. Grand Ave. Ry. Co., 21 S. W. Rep., 214.

¹⁵ Chicago, St. L. & P. v. Spiker, 33 N. E. Rep., 280.

¹⁶ Baxter v. C. R. I. & P., 54 N. W. Rep., 350.

¹⁷ O'Malley v. N. Y., L. E. & W., 22 N. Y. S., 48.

MEETINGS AND ANNOUNCEMENTS.

Dividends:

Dividends on the capital stocks of railroad companies have been declared as follows:

Chicago & Alton, quarterly, 2 per cent. on the common and preferred stocks, payable Dec. 1.

Cleveland & Pittsburg, quarterly, 1½ per cent., payable Dec. 1.

New York, Susquehanna & Western, 1½ per cent. on the preferred stock, payable Nov. 27.

Pennsylvania, semi-annual, 2½ per cent., payable Nov. 30.

Stockholders' Meetings.

Meetings of the stockholders of railroad companies will be held as follows:

Baltimore & Ohio, annual, Baltimore, Md., Nov. 20.

Buffalo, Rochester & Pittsburgh, annual, New York City, Nov. 20.

Grand River Valley, annual, Jackson, Mich., Jan. 10.

New York, Lake Erie & Western, annual, New York City, Nov. 28.

New York, Pennsylvania & Ohio, annual, Cleveland, O., Dec. 6.

Spokane Falls & Northern, annual, Spokane, Wash., Nov. 13.

Technical Meetings.

Meetings and conventions of railroad associations and technical societies will be held as follows:

The *Southern & Southwestern Railway Club* will meet at the Kimball House, Atlanta, Ga., Nov. 16.

The *Central Railway Club* will meet at the Hotel Iroquois, Buffalo, N. Y., on the fourth Wednesday of November.

The *Western Railway Club* meets in the rooms of the Central Traffic Association, Monadnock Building, Chicago, on the third Tuesday in each month, at 2 p. m.

The *New York Railroad Club* meets at the rooms of the American Society of Mechanical Engineers, 12 West Thirty-first street, New York City, on the third Thursday in each month, at 7.30 p. m.

The *Northwest Railroad Club* meets at the Ryan Hotel, St. Paul, on the second Tuesday of each month, except June, July and August, at 8 p. m.

The *American Society of Civil Engineers* meets at the House of the Society, 127 East Twenty-third street, New York, on the first and third Wednesdays in each month.

The *Canadian Society of Civil Engineers* meets at its rooms, 112 Mansfield street, Montreal, P. Q., every alternate Thursday.

The *Technical Society of the Pacific Coast* meets at its rooms in the Academy of Sciences Building, 819 Market street, San Francisco, Cal., on the first Friday in each month, at 8 p. m.

The *Tacoma Society of Civil Engineers and Architects* meets in its rooms, 201 Washington Building, Tacoma, Wash., on the third Friday in each month.

The *Association of Engineers of Virginia* holds informal meetings the third Wednesday of each month, from September to May, inclusive, at 719 Terry Building, Roanoke, at 8 p. m.

The *Boston Society of Civil Engineers* meets at Wesleyan Hall, Bromfield street, Boston, on the third Wednesday in each month, at 7.30 p. m.

The *Western Society of Engineers* meets at 78 La Salle street, Chicago, on the first Wednesday in each month, at 8 p. m.

The *Engineers' Club of St. Louis* meets in the Odd Fellows' Building, corner Ninth and Olive streets, St. Louis, on the first and third Wednesdays in each month.

The *Engineers' Club of Philadelphia* meets at the House of the Club, 1122 Girard street, Philadelphia, on the first and third Saturdays of each month, at 8 p. m.

The *Engineers' Society of Western Pennsylvania* meets at its rooms in the Thaw Mansion, Fifth street, Pittsburgh, Pa., on the third Tuesday in each month, at 7.30 p. m.

The *Civil Engineers' Club of Cleveland* meets in the Case Library Building, Cleveland, O., on the second Tuesday in each month, at 8 p. m. Semi-monthly meetings are held on the fourth Tuesday of each month.

The *Engineers' Club of Cincinnati* meets at the rooms of the Literary Club, No. 24 West Fourth street, Cincinnati, O., on the third Thursday in each month at 8 p. m.

The *Engineers' Club of Kansas City* meets in Room 200, Baird Building, Kansas City, Mo., on the second Monday in each month.

The *Engineering Association of the South* meets on the second Thursday in each month, at 8 p. m. The Association headquarters are at The Cumberland Publishing House, Nashville, Tenn.

The *Denver Society of Civil Engineers* meets at 36 Jacobson Block, Denver, Col., on the second and fourth Tuesdays of each month except during July, August and December, when they are held on the second Tuesday only.

The *Montana Society of Civil Engineers* meets at Helena, Mont., on the third Saturday in each month, at 7.30 p. m.

The *Engineers' Club of Minneapolis* meets in the Public Library Building, Minneapolis, Minn., on the first Thursday in each month.

Master Car Builders' Association.

The Twenty-eighth Annual Convention of the M. C. B. Association will be held at Saratoga, N. Y., beginning June 12, 1894. The headquarters will be at Congress Hall. Rooms may now be engaged by addressing Mr. H. S. Clement at that hotel.

The Secretary announces that lithographed copies of the drawings of standards and recommended practice, as appearing in the Proceedings of 1893, may be had on sheets 30 x 38 in. by applying to him at the Rookery, Chicago, Ill. These sheets will be sold at 25 cents each. Pamphlets containing the text of the Standards and Recommended Practice, as printed in the Proceedings of 1893, are now ready at five cents each. Arbitration cases from 1 to 200 inclusive are also ready and on sale.

The committee on steel tired wheels issues a circular, being a blank of four pages, containing a great number of questions.

Association of Engineers of Virginia.

The regular fall meeting was held in Roanoke on Oct. 27 and 28 and Nov. 1, the session of Oct. 28 being followed by a dinner and a stereoscopic exhibition of World's Fair views by Mr. G. R. Henderson. A memoir on the late James H. Fitts, Professor of Mechanical Engineering at the Virginia Agricultural and Mechanical College, at Blacksburg, and Vice-President of the Association, was presented by Mr. H. A. Gillis. The main business of the meeting was the discussion of a report by a special committee appointed at the summer meeting to frame a set of building laws for the city of Roanoke. The report, as adopted, provides not only for the strength and stability of buildings and their safety from fire, but also provides for sanitary safety, and makes rules for the proper enforcement of the laws. While designed primarily for the city of Roanoke, they readily can be made applicable to any town or city.

Boston Society of Civil Engineers.

A regular meeting of the Society was held at its rooms, 36 Bloomfield street, Boston, on Wednesday evening, Oct. 18, 1893. Messrs. J. N. McClintock, of Boston; George L. Mirick, of Everett; Walter H. Norris, of Melrose, and Chester W. Smith, of West Boylston, were elected members of the Society. The deaths of two members were announced, that of Charles W. S. Seymour, of Hingham, which occurred on Oct. 15, and that of Fred. H. Barnes, of Waltham, which occurred on Oct. 16.

Prof. Robert H. Richards, of the Massachusetts Institute of Technology, read the first paper of the evening describing the Prismatic Stadia-Telescope and giving the results of some work done with it showing the degree of accuracy attained.

The Secretary read a paper by Mr. A. Fteley, of New York, on the construction of reservoir embankments. A paper was also read on the same subject prepared by Mr. Edwin F. Smith, Engineer of the Canal Department of the Philadelphia & Reading.

A communication from Mr. Chas. C. Campbell, of Lawrence, was read, giving his experience as to the value of clay as a preservative for sheet piling and wooden flumes. Mr. J. Waldo Smith, Assistant Engineer of the East Jersey Water Co., contributed a paper on the compacting of earth in dams and embankments. Mr. Desmond Fitzgerald closed the discussion of the evening with an account of some of the dams built in India.

Engineers' Club of St. Louis.

The club met on Nov. 1 at the Washington University. President Moore in the chair and 26 members and two visitors present. Messrs. R. McCulloch and A. L. Tuttle were proposed for membership. Communications from the German Engineering Society and Austrian Society of Engineers and Architects thanking the American engineering societies and clubs for courtesies during the Columbian Exposition were read. Prof. Johnson described Colonel Flad's new suction dredge boat and presented full detailed blue prints illustrating its construction. Discussion followed by Messrs. Wheeler, Moore, Bounton, Curtis, Hermann.

PERSONAL.

—Mr. F. C. Locey has been recently appointed Master Mechanic of the Illinois Central Railroad, in the place of W. H. Whittaker, with headquarters at McComb City, Miss.

—Mr. James Bryan, of Brooklyn, was last week elected a director and Vice-President of the Ohio Southern Railroad. He is a large holder of the securities of that company.

—Mr. C. H. Sharman, formerly Superintendent of the Wiggins Ferry Co., has been appointed General Manager of the New Orleans & Northwestern Railroad, with headquarters at Natchez, Miss.

—Mr. Daniel W. Lawler, who was the Democratic candidate for Governor of Minnesota last year, has been appointed General Counsel of the Chicago Great Western Railroad, succeeding Judge J. W. Lusk.

—Mr. F. A. Winchell, for a number of years prominently connected with the Crane Company, of Chicago, as Auditor, has associated himself with the New York Belting & Packing Company, Ltd., 13 Park Row, New York City, as Manager of sales department.

—Mr. J. T. Odell, formerly General Manager of the Bal-

timore & Ohio, who was elected President of the New York & New England last week, is to assume the duties of his new position on Nov. 12. He will serve as General Manager of the line as well as Vice-President.

—Mr. John A. Potter, Chief Mechanical Engineer for the Carnegie Steel Co., resigned Nov. 1 to accept the general management of the Britton Iron & Steel Works, at Cleveland, O. Mr. Potter was superintendent of the Homestead plant during the labor troubles there in July, 1892.

—Mr. C. B. Seger, of New Orleans, has been appointed Auditor of the Galveston, Harrisburg & San Antonio and Texas & New Orleans roads of the Southern Pacific system. Mr. Seger was formerly Assistant Auditor of the Southern Pacific at New Orleans. His office has been changed to Houston, Tex. He succeeds Mr. R. S. Batson, resigned.

—Mr. C. S. Mellen, Second Vice-President of the New York, New Haven & Hartford, has been given the direct management of the lines west of New London, designated as the New Haven system. This extension of his authority gives him practically the same duties as those performed by Mr. Lucius Tuttle when he was Vice-President.

—Mr. J. E. Gimperling, Superintendent of the Cincinnati, Dayton & Ironton and of the Cincinnati, Dayton & Chicago, both roads belonging to the Cincinnati, Hamilton & Dayton system, has resigned to accept an agency for paints and varnishes. He has been Superintendent of these roads under various names for nearly 20 years. The office of Superintendent is to be abolished on his retirement.

—Mr. J. R. Busk, of the Colorado Midland, and a party of Eastern friends consisting of T. M. Davis, of Newport; Prof. A. Agassiz, of Cambridge, and J. R. Proctor, of Kentucky, has been visiting the Busk tunnel, in Colorado, on the line of the Colorado Midland. The tunnel bears the name of this Mr. Busk, who negotiated the sale of the bonds, and was formerly Chairman of the Board of Directors of the Colorado Midland.

—Mr. W. E. Baily, Superintendent of Transportation on the Lehigh & Hudson River road of New York until March last, has returned to the service of that company, having been appointed Superintendent, with office at Warwick, N. Y. In July last he became Superintendent of the Poughkeepsie Bridge route, then operated as the New England Division of the Philadelphia & Reading, but he resigned this position a few weeks ago.

—Mr. J. D. Hawks, has been appointed General Manager of the Detroit, Bay City & Alpena road. Railroad men who know Mr. Hawks will be glad to learn that he has returned to the service in which he has made an enviable record as an engineer. His new appointment will give him an opportunity to gain distinction in new lines of railroad work. Mr. Hawks resigned as Chief Engineer of the Michigan Central a little over a year ago, to accept the office of General Manager of the Detroit Citizen's Street Railway Co.

—Mr. William A. Baldwin was last week elected President of the Cleveland & Marietta road, to operate it for the Pennsylvania, which now controls the line. Mr. S. B. Liggett, Secretary, and Mr. T. H. B. McKnight, Treasurer, of the Pennsylvania Lines, have been elected to similar offices on the Cleveland & Marietta to succeed Mr. G. H. Candee, of New York, who held both offices. Mr. Baldwin was formerly connected with the Pennsylvania Company for nearly 30 years and was Manager between 1882 and 1888. In the latter year he became Vice-President and General Manager of the Buffalo, Rochester & Pittsburgh, and continued in that office until 1892; since that time he has not been in active railroad service.

—Mr. Thomas Reynolds, Superintendent of the Indianapolis and Sandusky divisions of the Cleveland, Cincinnati, Chicago & St. Louis, has retired from that position, but will remain in the service of the company in another capacity. The Indianapolis Division has been added to the jurisdiction of Mr. T. J. Higgins, Superintendent of the Cleveland Division, which will give that division a mileage of 342. The Sandusky Division is now included with the Cincinnati Division, of which Mr. William Gibson is Superintendent. The road is now operated in six divisions, each in the direct charge of a division superintendent. It was intended to abolish at least two of these divisions and add the mileage to other divisions of the system, but this plan has been given up for the present, and it is stated that no other changes are to be made.

—Mr. W. J. Martin has been appointed General Freight and Passenger Agent of the Philadelphia, Reading & New England, with office at Hartford, Conn., the appointment to take effect Nov. 15. Mr. Martin began his railroad career as ticket agent and telegraph operator at Hancock, N. Y., on the Oswego Midland Railroad in 1873. He was afterward in the Middletown office of the same company and later in the passenger auditing department of the New York, Susquehanna & Western in New York City, and then General Freight and Passenger Agent of the old Jersey City & Albany road that extended from Jersey City to Haverstraw, N. Y., and which was absorbed by the West Shore when that road was built. Mr. Martin has been chief clerk of the freight and passenger departments of the New York, Ontario & Western for the past 13 years and has a thorough mastery of all the details of the freight and passenger department. F. W. Smith, General Baggage Agent, at the foot of Franklin street, New York City, has been appointed Chief Clerk to succeed Mr. Martin.

—The consolidation of the Baltimore & Ohio Southwestern with the Ohio & Mississippi has resulted in a number of changes in the organization of the company. Most of the officers of the Baltimore & Ohio Southwestern retain the positions and titles with the consolidated company that they held before the merger. Mr. Edward R. Bacon, of New York, has been elected President of the new company; Mr. W. W. Peabody continues as Vice-President and General Manager; Mr. I. G. Rawn as General Superintendent; Mr. R. M. Fraser as General Freight Agent, and Mr. D. D. Carothers as Engineer of Maintenance of Way, Mr. L. C. Fritch, who held a similar position on the Ohio & Mississippi, retiring. The principal officers of the Ohio & Mississippi who remain with the consolidated company are Mr. Frank W. Tracy, President, who is Chairman of the Executive Committee of the new company; Mr. C. C. F. Bent, Superintendent, who becomes Superintendent of Construction of the consolidated lines, and Mr. William Duncan, General Freight Agent, who becomes Second Vice-President and Traffic Manager, with office at St. Louis.

ELECTIONS AND APPOINTMENTS.

Baltimore & Ohio Southwestern.—The agreement of consolidation with the Ohio & Mississippi road has been recorded in the various states through which the roads extend. The names of directors of the consolidated company are given in the following list: Edward R. Bacon, William L. Bull, Edgar T. Welles, Edward R. Bell, W. Mertens and John H. Davis, New York; W. W. Peabody, Lowe Emerson, F. H. Alms and Briggs S. Cunningham, Cincinnati; Frank W. Tracy, Springfield, Ill.; Julius S. Walsh, St. Louis; James H. Wilson, Wilmington, Del., and John Haseltine and Patrick Buchan, London, England. The directors have chosen the following officers: President, E. R. Bacon; Vice-President and General Manager, W. W. Peabody; Second Vice-President, Wm. Duncan; Treasurer, W. E. Jones; General Counsel, Judson Harmon; Secretary, W. W. Peabody, Jr.; Assistant Secretary, Edward Bruce.

President Bacon announces the following appointments: Treasurer, William Jones; Auditor, E. S. Thomas; General Superintendent, I. G. Rawn; General Passenger Agent, O. P. McCarty; Superintendent of Construction, C. C. F. Bent; Chief Engineer in Charge of Maintenance of Way, D. D. Carothers; General Counsel, Judson Harrison; Assistant General Counsel, E. W. Strong. Messrs. Jones, Thomas, Rawn, McCarty and Fraser retain the titles they held on the Baltimore & Ohio Southwestern before the consolidation.

Buffalo, Rochester & Pittsburgh.—A. Bardsley has been appointed Master Mechanic of the Buffalo and Pittsburgh divisions, with headquarters at Bradford, Pa. He was for several years Division Master Mechanic of the Northern Pacific.

Carthage, Watertown & Sacket's Harbor.—A new board of directors was elected for this company last week to represent the New York Central & Hudson River road. The new directors are as follows: H. Walter Webb, John M. Toucey, Edgar Van Erten, Samuel Barton, Ira A. Place, Joseph Mullin, Daniel G. Griffin, William T. Cornell, George H. Sherman, George C. Sherman, William W. Taggart, Isaac P. Powers and Azariah H. Sawyer. The new directors elected the following officers: President, H. Walter Webb; Vice-President, John N. Toucey; Treasurer, E. V. W. Rossiter; Secretary, Ira A. Place, New York City.

Chicago & Eastern Illinois.—The company has just leased space in the new Ellsworth building on Dearborn street near Polk street station, Chicago, where it will occupy five floors, from the fifth to the ninth inclusive, and will move in as soon as the offices can be made ready.

Chicago Great Western.—Daniel W. Lawler has been appointed General Solicitor, vice Judge J. W. Lusk, resigned.

Chicago, Milwaukee & St. Paul.—J. A. Whaling has resigned as General Storekeeper to become Purchasing Agent for the Wisconsin Central with headquarters at Milwaukee, Wis.

Chicago, Rock Island & Texas.—J. E. Holtz, of Clinton, Mo., has been appointed Master Mechanic, with headquarters at Fort Worth, Tex.

Cincinnati, Portsmouth & Virginia.—John C. Gleason, formerly Trainmaster and Superintendent of Telegraph, has been appointed Superintendent of Transportation. H. L. Stroupe has been appointed Chief Train Dispatcher. The office of Trainmaster has been abolished.

Cleveland, Cincinnati, Chicago & St. Louis.—Changes have been made in the operating divisions of the road, abolishing the Indianapolis and Sandusky divisions which have been operated together, with Thomas Reynolds as Superintendent. The following order was issued announcing the changes: The Cleveland Division has been extended from Gallon, O., to Bellefontaine, O., and the Indianapolis Division will extend from Bellefontaine to Indianapolis. The jurisdiction of J. T. Higgins, Superintendent of the Cleveland Division, will be extended over the Indianapolis Division with office at Cleveland. The jurisdiction of William Gibson, Superintendent of the Cincinnati Division will be extended over the Sandusky Division, with office at Springfield, O.

Cleveland & Marietta.—At a meeting of the Board of Directors held on Oct. 30 William A. Baldwin was elected President and General Manager of the company, to succeed A. T. Wikoff, resigned. His office will be at Cambridge, O. The following officers have also been elected to the positions named: S. B. Liggett, Secretary, office at Pittsburgh; and T. H. B. McKnight, Treasurer, office at Pittsburgh.

Duluth, South Shore & Atlantic.—Edward V. Skinner, General Eastern Agent of the Canadian Pacific, at 353 Broadway, New York, has also been appointed General Eastern Agent of this company, at the same address.

Great Northern.—A. J. McCabe, formerly Superintendent of the Montana division, has been appointed Superintendent of the Cascade division, with headquarters at Leavenworth, Wash. E. W. Batchelder, formerly Assistant Superintendent of the Fergus Falls division, has been appointed Superintendent of the Montana division, to succeed A. J. McCabe, transferred.

Kansas City, Osceola & Southern.—Henry E. Renick has been appointed Train Master, with office at Kansas City, Mo. The office of Car Accountant has been abolished.

Missouri, Kansas & Texas (of Texas).—E. D. Halsted has been elected Treasurer of the lines in Texas, with office at Denison, Tex., vice N. S. Ernst, resigned. A. A. Krause has been appointed General Agent of the Texas lines with office at Denison, Tex.

New York, Chicago & St. Louis.—The jurisdiction of W. L. Blair, Superintendent of the Eastern division, has been extended from Cleveland west to Bellevue, O., 65 miles. This addition of this mileage to the Eastern division makes it nearly equal in length to the Western division.

North Pacific Coast.—J. B. Stetson has been chosen President of the road, in place of W. Steel, resigned, with headquarters at San Francisco, Cal., and A. Borel has been chosen Vice-President, in place of C. Denervand.

Sioux City, O'Neill & Western.—At a meeting of the Board of Directors, on Nov. 6, a new board was elected, composed of representatives of the creditors of the old railroad syndicate. The new directors are D. L. Plummer, of Wausau, Wis.; John Ellis, of Kewanee, Ill.; W.

S. Silverthorn, of Wausau, Wis., and William Reynolds, Marblehead, Mass. T. C. Hills, of Sioux City, has been appointed Receiver.

Union Pacific.—The Receivers of this company have opened an office at 36 Wall street, New York City.

RAILROAD CONSTRUCTION, Incorporations, Surveys, Etc.

Addison & Centralia.—A party composed of Senator J. N. Camden, President of the West Virginia Central & Pittsburgh; E. R. Bacon, President of the Baltimore & Ohio Southwestern; C. K. Lord, Vice-President of the Baltimore & Ohio, and J. A. Fickinger, Chief Engineer of the West Virginia Central & Pittsburgh, made a trip of inspection over the latter road last week, at Centralia; they left the car to make the trip over the proposed line of the above road from Centralia to Addison, the county seat of Webster County. The proposed road is to be a feeder for the West Virginia Central & Pittsburgh road. It will pass through a good timber and coal country, and will develop a region 100 miles square which is at present without railroad facilities. The incorporators of the new line are all connected with the local interests of the West Virginia Central & Pittsburgh and Baltimore & Ohio roads.

Alberta Railway & Coal Co.—The old portion of this road, from Dunmore on the Canadian Pacific west to Lethbridge, in Alberta, Can., is now being changed to standard gauge, the present gauge of this division, as well as of the line from Lethbridge south to Great Falls, Mont., being 3 ft. Over 90 miles of standard gauge track has been laid, the entire distance being 109 miles. It is expected that the work will be completed by Nov. 15. The road connects at Dunmore with the Canadian Pacific main line, and it is thought likely that the division which is now being made standard gauge will be used by that company as a portion of the proposed new line through the Crow's Nest Pass. The surveys through the glass made by the company this year have nearly all started from Lethbridge.

Alberta Southern.—Application will be made to the Parliament of Canada next session for an act to incorporate this company with power to construct a line from the town of Calgary southeast to the town Lethbridge, 50 miles, and thence to the International line.

Big Horn Southern.—A change in the route of this road decided upon by the directors, some time ago, has necessitated the filing of new articles of incorporation in Montana. The northern terminus of the road is to be at a point on the Yellowstone River in Yellowstone County. From that point the road is to be constructed across the Crow Reservation to the valley of the Big Horn River, and across the Custer Military Reservation, and up the valley of the Little Big Horn across the south boundary of the Crow Reservation. No information is vouchsafed as to when any work will be done on the road.

Boston & Nova Scotia Coal Co.—The promoters of the Orangedale and Broad Cove branch, 35 miles in length, are in Ottawa endeavoring to secure a subsidy from the Canadian Government. The company has already secured the Provincial subsidy in Nova Scotia, and considerable work has already been done on the line of railroad.

British Columbia Roads.—Application will be made, at the next session of the Parliament of Canada, for an act to incorporate a company to construct a short line from a point on the Gulf of Georgia to the City of New Westminster, B. C., with a branch line in an easterly direction through Surrey, Langley and Matsqui, to a point near Abbotsford, B. C.

British Columbia Southern.—Twenty miles of this road has been definitely located in East Kootenay. The line, as located, runs along the east side of Elk River to the confluence of Michel Creek, thence up the Valley of Michel Creek.

Chicago, Sioux City & Bismarck.—The recent incorporation of this company in Illinois has been noted in these columns. The following statements about the project are from one of the officers of the company: The route of the railroad is from Chicago, via Dubuque and Sioux City, Ia., to Pierre, the capital of South Dakota, thence to Bismarck, the capital of North Dakota. Surveys are now going on in Illinois, Iowa and South Dakota. The route of the road is mostly through level prairie land in which there will be no heavy grading. The company is making arrangements to consolidate with the Chicago, Cascade & Western Railroad Company, an Iowa corporation having its home office at Cascade, Ia. It has contracted to build a spur of its road 50 miles in length by Jan. 1, 1894, in South Dakota. The officers are: Ira Brown, President; B. F. Bell, Vice-President; D. H. Lee, Treasurer; and S. C. Rollins, of Chicago, Secretary.

Choctaw Coal & Railway Co.—An extension of time for completing the road as surveyed through the Indian Territory has just been granted by Congress. The road was to have been completed this year, but it was found that the work could not be concluded in the time specified and an application was made to Congress to extend it for three years. The road reaches valuable coal fields and mineral deposits, but owing to the lack of facilities for transporting the output they cannot be developed. The road is in the hands of receivers, and plans are being formulated for the construction of a connecting line, to join the Eastern and Western divisions. About 120 miles of road will be built between Oklahoma City and South McAlester.

Cincinnati, Jackson & Mackinaw.—A meeting of the stockholders, representing more than two-thirds of the share capital of the company, was held at Toledo, O., on Nov. 1; the principal object of the meeting was to vote on the purchase of the Cincinnati, Lebanon & Northern road. There was no opposition to authorizing the directors to secure the control of that line, which will give the company an entrance into the city of Cincinnati. It would be necessary to build about 10 miles of track to connect the roads. The Cincinnati, Lebanon & Northern has good terminals in Cincinnati, and extends north about 30 miles to Dodds, a small town in Warren County, O., about 10 miles southeast of Franklin, the southern terminus of the Cincinnati, Jackson & Mackinaw.

The officers of the company are also anxious to extend the line from its northern terminus, which is at present at Addison, north to the city of Jackson, Mich., about 20 miles and it is very likely that some plan for building the line to Jackson will soon be agreed upon.

Flint & Pere Marquette.—There is renewed talk of the building of a line into the city of Detroit by this

company. The present report is revived in connection with a report that an effort is being made to purchase control of the road in the interest of the Columbus, Hocking Valley & Toledo. The only foundation for this report is the purchase of a considerable number of shares by a director of that company, individually, but no effort will be made to obtain control. The officers state that the line into Detroit is fully decided upon and that as soon as the business situation improves it is proposed to build the 14 miles of road through from Monroe to Toledo, thereby securing excellent connections with the Pennsylvania, Lake Shore, Baltimore & Ohio and Hocking Valley roads. The right of way is already secured, and the cost of construction—about \$350,000—can be provided for out of the consolidated mortgage five per cent. bonds now in the company's treasury.

Grand Trunk.—The Elmira branch of the road will be extended to Drayton, Ont., at an early date.

Great Northern.—The contract for building a spur, four and a half miles in length, to some recently developed granite quarries near St. Cloud, Minn., has been let to Foley Brothers & Guthrie, of St. Paul, Minn.

Harding Coal Co.—This company is building a two mile road from its mines at Elkins, W. Va., to the main line of the West Virginia Central & Pittsburgh road, and a line a mile in length between the two mines it operates. The work is being done by day labor.

Iowa Central.—A survey is now under way for a connecting link for this line at Belmont, Ia., and the Mason City & Fort Dodge road.

Leech Lake & Mississippi.—A party of engineers, under H. A. Rider, is now engaged in locating the route of this line between Little Falls and St. Cloud, Minn.

Midland Terminal.—President Lillibridge, of Colorado Springs, and General Manager H. Colbrann have been going over the line this week and work has been commenced on the line to Cripple Creek. It is officially stated that the work will be pushed to completion with the best possible speed. The company is incorporated for \$1,000,000, and the estimated cost to finish the line is placed at \$600,000. The line will be 22 miles long, with eight miles of branches to the different mining districts. Eight and one-half miles of road has been graded and the ties laid, while the bridge and mason work is all completed. The roadbed will be prepared for standard gauge track, but for the present the track will be narrow gauge. A traffic agreement has been made with the Atchison, Topeka & Santa Fe, but the company is a distinct corporation. The question of an extension to Florence or Canon, Col., is proposed. Cripple Creek is growing very fast this fall and it is a most promising camp. The connection with the Colorado Midland is made near Florissant.

Nevada Southern.—Mr. Isaac E. Blake, of Denver, President of this road, is in Los Angeles, Cal., to place bonds to the amount of \$30,000 in order to complete a 10-mile gap over the mountains, and offers to secure the loan by first mortgage bonds on the road already built and which is doing a paying business. The intention is to extend the road through the range of mountains on the border of California and Nevada, after which the balance of the road will be easy construction, as it debouches into the valleys of Southern Nevada and Utah. The road will then run straight to the North through the Dry Lake Valley for a distance of 100 miles to the coal fields. Over the desert there are no heavy grades, and all that is required is simply to lay the ties and rails. Salt, borax and nitrates exist in great quantities in the section traversed by this new road, and there are gold, copper and lead mines already in operation. Iron and coal in large quantities exist in Southern Utah, which can be mined at a minimum cost and which would be brought to Los Angeles and tidewater by this new route. With the completion of this road to its northern destination it can be made to connect with both the Rio Grande Western and the Union Pacific systems, thus opening up an immense territory to Southern California, and at the same time giving those roads easy access to Pacific ports.

New Orleans & Northwestern.—The contract has been let to a St. Louis firm for building 18 miles of road which will close the gap in this line between Rayville and Collins, La. The road is in operation from Natchez, Miss., to Rayville, 77 miles, and a line was built last year from Collins north to Bastrop, 7½ miles. The extension gives a connection with the Houston, Central Arkansas & Northern, which is operated by the Missouri Pacific.

New Roads.—The engineers have completed the survey of the proposed line between St. Jean Chrysostome, Que., and Napierville, but it will be some time before they can submit their plan and report.

Northwestern Elevated.—Articles for the incorporation of this company with a capital stock of \$15,000,000 were recently filed at Springfield, Ill. The incorporators and directors named are all from Chicago or vicinity and claim to have secured the necessary financial support for the completion of the project. It is proposed to build from the business center of the city in a northerly direction, with several branches in a westerly and northerly direction from different points on the main line.

Ottawa, Arnprior & Parry Sound.—Grading is completed to Golden Lake, 84 miles from Ottawa, and track is laid to a point three miles west of Arnprior. The latter city is 36 miles from Ottawa. The road is an extension of the Canada Atlantic, and is under construction from Ottawa, Ont., west to Parry Sound.

Pittsburgh, Fort Wayne & Chicago.—Three miles of second track were put in operation between Lawrenceville and Orrville, O., last week. This leaves about 11 miles yet to be built at places between Alliance and Crestline, in order to complete the double-tracking of the entire eastern division, and this work, it is expected, will be finished by Dec. 1.

Prescott & Arizona Central.—The train service on this road has been abandoned by order of the Receiver, who has been in charge since Aug. 1 last. The road connects with the Atlantic & Pacific at Prescott Junction and extends south from that point to the town of Prescott, Ariz., a distance of 74 miles. This is a standard gauge road which has maintained a daily passenger train service each way, but the travel has decreased rapidly lately until it is now almost nothing on account of the building of the Santa Fe, Prescott & Phoenix. That line starts from the Atlantic & Pacific at Ashfork, east of Prescott Junction, and is now completed to Prescott. The route is much more direct than that of the Prescott & Arizona Central, Prescott being reached with a line 60 miles long, 14 less than that of the older road.

Quebec Roads.—Notice is given that application will be made to the Parliament of Canada next session for an act to incorporate a company to construct a road

from a point on the Intercolonial Railroad, between Ste. Flavie and Little Metis Station, in the District of Rimouski, easterly to tide-water on the St. Lawrence River in the Parish of Matane.

Revelstoke & Arrow Lake.—The construction of this branch road of the Canadian Pacific is being vigorously pushed forward. The track has reached the Illecillewaet River and, as soon as the bridge is finished, which will be in a few days, the men will resume track-laying. The contractors say that the new route will be open this year for the first fifteen miles south of the Canadian Pacific line and the town of Revelstoke, B. C. The route is 28 miles long, the southern terminus of the line being on Arrow Lake.

San Diego, Yuma & Phoenix.—Steady progress is being made in the construction of this road near San Diego, Cal. The graders are now working through the large Denari-Mosto vineyard. The line now ends five miles east from Phoenix Junction and 15 miles from San Diego. President W. H. Carlson, of San Diego, reports that the work will now proceed steadily until some of the more difficult mountain routes are reached.

Sedalia, Warsaw & Southwestern.—President George J. Gould, of the Missouri Pacific, who has been traveling in the West, stated in a recent view that in the event of the suit for a receiver for this road being decided in favor of the Missouri Pacific the road would be changed to a standard gauge and extended as far south as Springfield. He could not say when the work of extension would be commenced, but it would have to be delayed until capital could be obtained on easier terms than at present.

Southern Pacific.—The branch built to reach the grounds of the Midwinter Fair is open to traffic. It leaves the main line a mile south of Ocean View station. Thence it runs in a northwesterly direction, crosses a lake on a trestle and reaches the beach near the Ocean-side House. It follows the shore line to a connection with the Park and Ocean road. From a point on this road almost due south of the Midwinter Fair site, a single spur track extends to the site. The length of the road is 16 miles. It is built for freight purposes, but on special occasions excursion trains may be run directly to the grounds.

The company has begun its construction work afresh on its new coast line extending from Santa Margarita southward, to a connection with its line already existing at Santa Barbara. At San Luis Obispo and the long tunnel at Santa Margarita, the main heavy work is in progress. H. E. Huntington, Assistant to the President, has stated that the company will prosecute the completion of the work with vigor, it being expected that 2,000 men would be given employment in order to early finish the work. Every effort will be made to have the work done by May 1, and, in the event of success, a celebration is to be held in San Luis Obispo in honor of the achievement. From Elwood, the present terminus of the Southern Pacific, Northern Division, to San Luis Obispo work will probably be commenced just as soon as that now in hand is completed.

Texas Midland.—President Green has had prepared amendments to the present charter of the company giving authority for the extension of the line from Roberts north to Paris, Tex., and also for a southern extension from Garrett. Three surveys have been made for the northern extension from Roberts, as stated last week, and surveys are about to be made for a short branch from Garrett to Ennis, Tex. President Green has agreed to build this latter line if he is given free right of way and voted a subsidy of \$16,000 by the people along the route.

Toledo & Ohio Central.—Owing to delays in completing the ballasting of track the complete opening of the Western Division, between Columbus and Toledo, has been postponed until Nov. 12.

Tuscarora Valley.—J. C. Morehead, of Port Royal, Juniata County, is at the head of a movement to construct an extension from East Waterford, Juniata County, to Dry Run, Pa., a distance of 16 miles. The road will be narrow gauge. The route proposed will require but little grading.

Valley (Ohio).—The movement for the extension of this road so as to form a connection between the city of Cleveland, O., and the Baltimore & Ohio or the Pennsylvania system in Belmont County, O., is taking definite shape. The proposition is to build a line to connect Cleveland with the coalfields of Harrison and Belmont counties, the preference being to connect at St. Clairsville, in Belmont County, with the Baltimore & Ohio, gaining at once the double advantage to Cleveland of a connection with the coalfields and an entrance of the Baltimore & Ohio into Cleveland. The Cleveland Chamber of Commerce two weeks ago appointed a committee composed of J. H. McBride, Chairman, James Ritchie, W. J. Hillands, J. W. Wardwell and J. K. Bole and others, who met a committee of citizens of Cadiz and St. Clairsville and made a proposition that if Harrison and Belmont counties will furnish free right of way for the line the money for building it will be raised by the Chamber of Commerce. The right of way is estimated to be worth about \$250,000.

Wheeling Bridge & Terminal.—Judge William H. Taft, of the United States Circuit Court, has granted permission to C. O. Brewster, as Receiver, to issue \$50,000 of receiver's certificates for the purpose of completing the road. The petition of the Receiver states that, at the time of his appointment, work was in progress on a line from Thirty-fifth street, in Wheeling, W. Va., to Benwood, W. Va.; that large sums of money had already been expended upon the construction and right of way; that the time allowed by ordinance for the completion of the road was until Jan. 1, 1894; that, if the work was not completed by that time, large sums of money already expended would become useless, and that the capacity of the road for earning money would be greatly enhanced by opening new fields of freight production. The work in question is well under way, the piles being driven almost the entire distance along the river front and the grading completed a good part of the way. The road will be about five miles in length, and opens to the Wheeling Bridge & Terminal several of the largest mills in the Ohio Valley. Messrs. Hallock Brothers have the contract and expect to have the road completed by Jan. 1, next.

Wyoming & Pierre.—This company was incorporated in Iowa recently with a capital stock of \$450,000, to engage in railroad construction and coal mining in the Black Hills, in South Dakota. The incorporators are Edward F. Cragin, Stephen W. Gilman, Henry Gilman, and A. L. Sweet, Chicago; and L. H. Parker, D. G. Scott, and Isaiah Cleminson, of Dubuque, Ia. The route will probably be from Minneapolis to mines owned by ex-Gov. Larrabee, of Iowa, the distance being about 20 miles.

GENERAL RAILROAD NEWS.

Baltimore & Ohio.—A loan of \$3,000,000 has been obtained in London by the company. The money is to be used in paying off floating obligations and enabling the company to carry on its policy of extension into tributary territory. Negotiations for this loan have been pending for several months. The \$3,000,000 was obtained by the placing in London of the bonds of the subsidiary lines the Baltimore & Ohio is building and supporting in Ohio, Western Pennsylvania and other points along its line. One of the terms of the deposit of these bonds in the hands of the English syndicate is that the holders shall have the option of purchasing them, if they so desire, before the maturity of the notes on which the loan was obtained. The new work now in progress includes the belt line tunnel in Baltimore, the Harpers Ferry improvements, doubletracking the Metropolitan Branch and building the State Line Railroad in Western Pennsylvania.

Baltimore & Ohio Southwestern.—The agreement of consolidation with the Ohio & Mississippi, recently ratified by the stockholders of both companies, has been filed for record in Ohio, Indiana and other states. The consolidated company is to have a capital stock of \$30,000,000, \$10,000,000 of common and \$20,000,000 of seven per cent. non-cumulative preferred stock. The company will issue \$36,000,000 of first consolidated mortgage bonds, guaranteed by the Baltimore & Ohio, and \$13,750,000 of five per cent. bonds in two classes—\$8,750,000 in Series A and \$5,000,000 in Series B. Of the \$36,000,000 of bonds to be issued, \$11,000,000 will be set aside as a redemption fund, and the other \$25,000,000 for exchange for the mortgage bonds and equipment certificates of the Ohio & Mississippi, the Cincinnati & Bedford, and the New Albany & Eastern, and to provide a fund for betterments, equipment, sinking fund and other purposes.

Buffalo & Susquehanna.—The records of the State Department at Harrisburg show that a mortgage of \$2,000,000 has recently been issued by the company, of which, however, not more than \$900,000 of the bonds are to be issued at present. This company is formed by the merger in September last of the Sinnemahoning Valley, Susquehanna, Buffalo & Susquehanna, Cross Fork and Cherry Springs companies. The 60 miles of road extending from a connection with the Western New York & Pennsylvania at Keating Summit east to Galeton, Pa., are already constructed, and work will soon be commenced on the extension from Galeton to Ansonia, in Tioga County, Pa., a distance of 13 miles, where the road will connect with the Fall Brook Coal Company's system, forming a new through line from Buffalo to New York and other Eastern cities. The new consolidated road runs through Austin, one of the heaviest lumber towns in the state, and Costello, where is situated the largest tannery in Pennsylvania, possibly in the world. The road taps the most important portion of Pennsylvania so far as timber is concerned, and furnishes really the only outlet by rail for more than 230,000 acres of virgin hemlock forest. Messrs. F. H. & C. W. Goodyear, who are the principal stockholders in the new railroad company, themselves own 86,000 acres, upon which they have given a mortgage as additional security to the holders of the railroad company's bonds. M. E. Olmsted, of Harrisburg, is General Counsel as well as President of the company, and all the proceedings relative to the organization and merger of the several companies and the issuance of the mortgage have been under his direct supervision. An application will soon be made to have the bonds listed on the New York Stock Exchange. At present they are offered for sale by Harvey Fisk & Sons, of New York. The road is of standard gauge throughout and the construction is of the very best, 70 lb. rails being used on all parts except sidings, where 65-lb. rails are used. The naturally heavy grades upon one or two portions of the line have been overcome by skillful engineering, so that they are not unfavorable.

Carthage, Watertown & Sacket's Harbor.—The New York Central & Hudson River Co. has now secured complete control of this road by purchasing the stock of the company held by the town of Watertown, N. Y. It is said that the stock was bought at par, the town receiving about \$300,000. The road has been operated since 1872 by the Rome, Watertown & Ogdensburg at an annual rental amounting to 37½ per cent. of its gross earnings. The purchase of the stock saves the New York Central about \$40,000 rental yearly. The road was built in 1872 and is 20 miles long from Carthage west to Sacket's Harbor on Lake Ontario.

Chesapeake, Ohio & Southwestern.—The stock of this road, owned by Mr. C. P. Huntington, who has held a controlling interest for many years, has been purchased by a syndicate of capitalists interested in the Louisville & Nashville and the Illinois Central. It is understood that the line will be operated jointly by those roads, but no formal statement of their connection with the purchase has been made. The purchase price is said to be \$6,000,000. Mr. Huntington some months ago gave an option on the stock to the Louisville & Nashville interest. It is said that payment for the stock will be made in ten-year notes indorsed by the Illinois Central, with a privilege to the Louisville & Nashville of becoming the absolute purchaser at maturity of the notes. Mr. Huntington says that the transfer has not been concluded, and that he has not agreed to sell any of the bonds of the Company which he owns. The road extends from Louisville to Memphis by way of Paducah, 392 miles, and crosses the Illinois Central tracks at Fulton, near the Tennessee State line. The advantage to the Illinois Central in its interest in the transaction will be the right to use that part of the line from Fulton south as an entrance into Memphis. There it will connect with its Mississippi Valley route to New Orleans.

Chicago & South Side Rapid Transit.—This company, operating the Alley elevated road of Chicago, reports earnings for six months from May 1, 1893, as follows:

Gross earnings.....	\$1,121,223
Operating expenses.....	467,458
Surplus.....	\$653,765

The operating expenses for this period were 41 per cent. of the gross earnings. The road carried 22,424,790 passengers in the six months.

Dover & Statesboro.—The foreclosure sale of this road took place at Statesboro, Ga., last week, and the property was purchased by F. T. Lockhart, of Augusta, who is understood to represent the present owners. It is said that the reorganization will be completed shortly.

and the road extended beyond its present terminus. It was built in 1889 between Dover and Statesboro, 10 miles, and although surveys have been made for important extensions actual work has never been commenced.

Litchfield, Carrollton & Western.—This road is now being operated by its own officers instead of as part of the Jacksonville Southeastern system. The surrender was made on Nov. 5, and was in pursuance of a decree made by consent of the parties concerned. Judge Allen released the property to Henry S. Carroll, as President and agent of the company. The line has been operated by Receivers Bostwick and Anderson in connection with the Jacksonville Southeastern, but not as a part of the system, being owned by a separate interest. The road extends from Barnett, near Litchfield, to Columbia, on the Illinois River, a distance of 50 miles.

Long Beach.—This road, which extends from Manahawkin to Beach Haven, Harvey, Cedars and other points on the South New Jersey coast, is to be sold at sheriff's sale early in November. In the foreclosure proceedings the Pennsylvania Railroad Company appears as the plaintiff. This is one of the unprofitable branch lines of the company in New Jersey. It was abandoned early in the year that train service would be abandoned, but an agreement was made with the property owners for operating the road through the summer.

Louisville & St. Louis.—The United States Circuit Court at Springfield, Ill., has ordered the sale of this road at foreclosure. The order was made by Judge Allen in the suit of Charles H. Brownell, of Indiana, trustee for the bondholders, against the Jacksonville Southeastern, the Jacksonville, Louisville & St. Louis and other roads. The decree is in favor of Brownell as trustee to the amount of \$322,129, and in default of payment the road is ordered to be sold at Mount Vernon, at a date to be fixed by the court. The road runs from Centralia to Drivers, a distance of 17 miles.

Manitou & Pike's Peak.—Passenger service was discontinued Nov. 4. The fall travel has been above the average, but the year's business has not compared with that of last year. There were 7,000 passengers carried this season against 17,000 last year, which was the Knights Templar convalesce year. The year has passed, however, free from accident, and the company is in good financial condition.

Maryland Central.—The first mortgage bondholders' committee, acting at the instance of Alexander Brown & Sons, of Baltimore, have instructed the Mercantile Trust & Deposit Co., of Baltimore, to ask for a foreclosure sale. The petition was filed in the United States court last week. The first mortgage bonds, amounting to \$850,000, are a lien on the road between Baltimore and Delta, 50 miles. The Maryland Central was consolidated with the Baltimore & Lehigh in 1891, and is the Maryland portion of that line, and is now operated by an independent receiver and separate from the Pennsylvania portion.

Missouri, Kansas & Texas.—The report of operations for the year ending June 30, gives the following table of earnings and expenses:

	1893.	1892.	Inc.
Gross earnings.....	\$10,388,191	\$9,750,563	\$637,628
Op. ex. and tax.....	7,510,734	7,380,567	130,167
Net earn.....	\$2,877,456	\$2,369,996	\$507,460
Int. and rentals.....	2,359,443	2,259,826	99,617
Sundry ac'ts. Cr.....	\$218,013	\$110,169	\$107,844
Surplus.....	20,033	Dr. 31,226	51,259
	\$238,046	\$78,943	\$159,103

The average mileage operated was 1,712 miles, an increase of 38 miles. The gross earnings per mile were \$6,067, an increase of \$243 and net earnings per mile were \$1,505, an increase of \$90. Operating expenses were 75.2 per cent. of gross earnings, a decrease of $\frac{1}{2}$ per cent.

Sioux City, O'Neill & Western.—In the United States Circuit Court at St. Paul, on Oct. 31, Judge Caldwell appointed Frederick C. Hills, of Sioux City, Ia., Receiver and fixed his bond at \$25,000. The application was made in the form of a bill in equity by the Manhattan Trust Co., of New York, trustee for the first mortgage bondholders. The road was formerly known as the Pacific Short Line.

Southern Arkansas.—This railroad, which was built in 1892 by the Southern Land & Lumber Co., of Dry Run, Ark., was sold at foreclosure sale last week together with the other property of the lumber company, including about 10,000 acres of timber land. N. C. Foster and J. J. Bagley, of Chicago, the well known lumber dealers, were the purchasers in the interest of the lumber company's stockholders, the price being \$122,000. The railroad is now completed for about 10 miles south of Dry Run through Calhoun County to the state line.

St. Louis Merchants' Bridge Terminal.—Articles in regard to the agreement with the Terminal Railroad Association in St. Louis were this week filed for record in Missouri, but they do not give many details of the agreement. The Terminal Railroad Association agrees to purchase 4,384 shares of stock of the Merchants' Terminal Bridge Co. and also indorse \$3,500,000 of its common stock.

Toledo, Ann Arbor & North Michigan.—The Farmers' Loan & Trust Co., of New York City, last week began suits in the United States Circuit Court, in Michigan, for the foreclosure of the various divisional mortgages of this company under which it is trustee. The Central Trust Co. has previously filed suits for the foreclosure of the road under the mortgages of which that company is trustee. It is thought that these various suits will be consolidated with that of the Craig Ship Building Co., the original suit under which the Receiver now in control of the road was appointed.

Wheeling & Lake Erie.—The following figures of earnings and expenses are from the annual report for the year ending June 30:

	1893.	1892.	Inc. or dec.
Gross earn.....	\$1,538,644	\$1,371,165	I. \$167,479
Oper. expen.....	1,009,382	884,026	I. 125,356
Net earn.....	\$529,262	\$487,138	I. \$42,124
Other income.....	57,346	58,963	D. 1,617
Net revenue.....	\$586,608	\$546,101	I. \$40,507
Fixed charges.....	374,359	354,011	I. 20,348
Balance.....	\$212,248	\$192,089	I. 20,159
Dividends.....	180,000		
Surplus.....	\$32,248		
Total surplus.....	150,666		

The increase in tonnage during the year amounted to 14.26 per cent., and the increase in earnings to 12.21 per cent. Gross earnings were at the rate of \$6,229 per mile, compared with \$5,642 per mile the previous year. The bituminous coal tonnage for the year was 1,367,958 tons, of which 743,521 were from the Wheeling, Lake Erie & Pittsburgh mines. About 25 per cent. of the increase in the operating expense consists of the cost of rebuilding cars. The rolling stock is in better condition than ever before. Marked improvements in trestlework, bridges, dockage and buildings have been made. A large terminal yard has been completed at Massillon, and will be used as the terminal point of the two divisions of the road.

The Toledo Belt road earned \$72,258, an increase of more than 30 per cent. The number of cars handled increased over 19 per cent., and the line is now earning the largest amount in its history.

TRAFFIC.

Traffic Notes.

The total number of passengers carried from New York to Chicago on the half fare trains during October was 10,500.

The receipts of flour and grain at Buffalo by lake from the opening of navigation to Nov. 1 were 156,925,955 bushels.

The shipment of coal over the main line of the Philadelphia & Reading for the month of October aggregated 924,274 tons, the largest quantity ever carried in a single month.

The Union Pacific has shipped over 1,100 cars of potatoes from Greeley and adjoining towns this season, and 5,000 cars more are promised. The potatoes go to Texas, Kansas and Nebraska.

The New York *Evening Post* has gathered figures showing that for the first nine months of this year the number of cabin passengers arriving from Europe was 113,480, and it is estimated that about 25,000 of them were visitors to the World's Fair. The exact figures, as given, are:

	1892.	1893.
Nine mos.....	45,683	78,434
Aliens.....	45,962	3,046
Citizens.....	91,650	113,480

For the 12 months of 1892 the arrivals were 22,568 greater than in 1891.

Chicago Traffic Matters.

CHICAGO, Nov. 8, 1898.

The Chicago Freight Bureau has made a formal complaint to the Interstate Commerce Commission, alleging discrimination against Chicago in rates to Southern points. The brief prepared recites that Chicago merchants are unable to compete with New York in Southern markets, owing to gross discrimination in freight rates in favor of New York; that no reduction in the rates from Chicago is desired, provided rates from New York are adjusted on a mileage basis equitably with a similar basis from Chicago.

There is nothing new in regard to the attitude of the Union Pacific as regards passenger rates on transcontinental business. It is generally considered as certain that the road will not join any association while in the hands of the Receivers, and the probabilities are that it will make open reductions if necessary to get what it deems its share of the business. The officials, however, protest that they do not entertain any desire to demoralize rates, and state that the future course of the company will be conservative.

The Illinois Central proposes running a series of land-seekers' excursions at low rates, with the object of populating its unoccupied lands in the Yazoo and Mississippi valleys.

Passenger rates to Denver and Colorado points are becoming demoralized, and tickets are being freely offered both from Chicago and Missouri River points at less than the agreed tariff.

The Receivers of the Jacksonville Southeastern have settled the differences existing between that line and its northern connection, the Santa Fe, and through traffic arrangements have been resumed. Since the Santa Fe threw it overboard for non-observance of agreement some time since it has had no Chicago outlet. The advantages of a traffic arrangement are mutual.

The inactivity in freight matters caused by the World's Fair has diverted attention from freight rates for several months. Now that the passenger business no longer demands so much attention the managers are looking more closely into freight rates, and it is being found that some of the lines have taken the opportunity to ignore their agreements and to make contracts which are likely to cause considerable trouble in the near future.

The shipments of eastbound freight, not including livestock, from Chicago, by all the lines for the week ending Nov. 4 amounted to 57,885 tons, against 63,333 tons during the preceding week, a decrease of 5,478 tons, and against 74,569 tons for the corresponding week last year. The proportions carried by each road were:

Roads.	W'k to Nov. 4.		W'k to Oct. 28.	
	Tons.	P. c.	Tons.	P. c.
Michigan Central.....	6,403	11.1	6,423	10.1
Wabash.....	4,051	7.0	4,533	7.2
Lake Shore & Michigan South.....	10,011	17.3	11,387	18.0
Pitts., Ft. Wayne & Chicago.....	8,015	13.9	7,880	12.4
Pitts., Cin., Chicago & St. Louis.....	6,970	12.0	8,011	12.7
Baltimore & Ohio.....	3,336	5.8	4,134	6.5
Chicago & Grand Trunk.....	2,588	4.5	3,128	4.9
New York, Chic. & St. Louis.....	4,998	8.4	6,021	9.5
Chicago & Erie.....	7,530	13.0	7,269	11.5
C., C. & St. Louis.....	4,053	7	4,547	7.2
Totals.....	57,855	100.0	63,333	100.0

Of the above shipments 2,019 tons were flour, 23,632 tons grain and millstuff, 9,759 tons cured meats, 11,889 tons dressed beef, 1,087 tons butter, 2,230 tons hides and 3,745 tons lumber. The three Vanderbilt lines carried 36.8 per cent., the two Pennsylvania lines 25.9 per cent. The Lake lines carried 72,483 tons, against 111,517 tons during the preceding week, a decrease of 39,034 tons.

(Other Chicago traffic news will be found on page 819.)

The Interstate Commerce Commission.

The Commission has decided the Case of Phelps & Co. v. The Texas & Pacific Railroad, which was filed March 2, 1892. The main grievance was that the road delivered cotton to other consignees without payment of charges, on condition that the freight bills when presented should be paid without any complaint as to overcharge, loss or damage, but would not so deliver to complainant. The facts seem to be that Phelps & Co. refused payment of a bill after they had agreed to the above-mentioned condition, and that the road, instead of falling back on the agreement, to compel payment, simply stopped delivering cotton to the firm except on payment of freight. The bill which made the trouble was made out at 50 cents a bale higher than the rate in the bill of lading, which latter was the legal (published) rate. It was afterward reduced to agree with the bill of lading, and was then paid, but the refusal to give credit continued. The Commission decides that the discrimination was illegal, chiefly on the ground that the road violated the law in collecting more than the legal rate, even if it promised to refund the same afterward. The decision is summarized in the report as follows:

1. The rates which carriers are required by the sixth section of the statute to publish, file and adhere to without deviation cover, not merely the carriage, but services rendered in receiving and delivering property as well.

2. The lien of carriers upon freight for charges earned is satisfied by the payment of rates for their services which they are lawfully entitled to demand, and a guaranty executed to a carrier by consignees, or third parties, which might be construed to enable the carrier, in consideration of freight delivery before settlement of transportation charges, to exact for requirement of that law, and a party to an interstate shipment cannot be excluded by the carrier from the privileges afforded to other patrons in the same locality because of his refusal to pay excessive freight charges, even though an agreement to subsequently refund the excess should accompany the demand.

3. The Interstate Commerce Act does not recognize indefinite or uncertain transportation charges, the idea of unequal compensation for like service, or discrimination in the treatment of persons similarly situated, is repugnant to every requirement of that law, and a party to an interstate shipment cannot be excluded by the carrier from the privileges afforded to other patrons in the same locality because of his refusal to pay excessive freight charges, even though an agreement to subsequently refund the excess should accompany the demand.

4. When actual weights of cotton shipments cannot be ascertained without great inconvenience to the shipper or carrier, and when transportation charges are promptly adjusted by the carrier upon the basis of actual weights furnished by the consignee, a practice of billing the cotton at a proper estimated weight per bale should not be deemed unlawful.

5. The retention of an overcharge has all the effect of extortion and unjust discrimination against the person from whom its payment has been required, and when the refund of an excessive charge has been unnecessarily delayed for a considerable period the officials responsible therefor become fairly chargeable with willful intention to violate the law.

The decision is written by Commissioner Knapp, and is of interest in connection with the secondary points mentioned in the fourth and fifth paragraphs of the syllabus, as well as on the main issue. The fifth paragraph should be printed in large letters and hung up in the claim offices of a good many roads.

The Massachusetts Interchangeable Mileage Ticket Law Unconstitutional.

The Supreme Court of Massachusetts decided on Nov. 3 that the interchangeable mileage ticket law passed by the last legislature, and requiring that each railroad in the state shall honor mileage books issued by any of the other roads, is unconstitutional.

The Court dismissed an information brought by the Attorney-General v. the Old Colony, to compel the respondent to sell mileage tickets to all who apply for them, and to redeem all such tickets presented by any other railroad corporation.

The Court says: "If the legislature cannot constitutionally require a railroad company to transport a passenger unless the fare is paid in advance, we have no doubt that the delivery of a mileage ticket issued by another corporation is not in itself a payment of the fare. The most formidable objections to the statute are that it authorizes one railroad to determine the conditions on which another railroad must carry passengers, and compels one railroad to carry passengers on the credit of another. A carrier can have no lien on the passenger to secure payment of the fare, and must of necessity collect the fare in advance or trust to the credit of the passenger or of some other person."

"Although by reason of the public nature of the employment the legislature can establish the rates of fare to be demanded by common carriers of passengers, we do not see that they can be compelled ultimately to take in payment anything which any other person could not be compelled to take in payment for a service rendered or in discharge of a debt. . . . The statute puts no limit upon the number of mileage tickets which any railroad may issue, or upon the time within which they must be used. It is possible that a railroad in need of money might resort to enormous sales of such tickets as a mode of raising money, and that those tickets might remain outstanding, to be used on other railroads indefinitely, and that many of them might be presented for redemption at some remote time in the future, when the railroad company issuing them might not be able to redeem them."

"The security for the ultimate payment of the fare in money ought, we think, to be as certain as that required when private property is taken for public uses, and we are of opinion that this statute does not provide adequate security. The objection that the statute authorizes one railroad to make conditions concerning the transportation of passengers which must be performed by other railroads also seems to us valid. . . . Without denying the power of the legislature to determine the form of the contracts which common carriers of persons or merchandise must make concerning transportation, and without considering the authority of legislature to delegate this power to a board of public officers, we are of opinion that this power cannot be delegated to private persons or corporations."

Judges Lathrop and Barker agree that the necessary effect of the statute is to apply and appropriate individual property to a public use without the owner's consent and without legal provision for a reasonable compensation therefor; and for this reason the statute is void. A majority of the court are of opinion that the petitions should be dismissed.

Judge Knowlton writes a dissenting opinion, in which Judge Holmes concurs. This takes the ground that the objections of his colleagues are "theoretical and speculative, rather than practical," and he holds that "the reasonableness and constitutionality of the statute are to be determined, in view of the existing facts in the management of railroad business, and not in view of the legal possibility that some corporation would insert in its mileage tickets an unusual or absurd provision."